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U.S. Air Power And The Soviet Bomb PAGE 12

FLYING

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BRITAIN'S NEW JET WARPLANES

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THE HOMEMADE RACERS

PAGE 36

BE YOUR OWN WEATHERMAN

By Dr. Irving P. Krick

NOTED METEOROLOGICAL CONSULTANT

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How to keep a bubble from bursting

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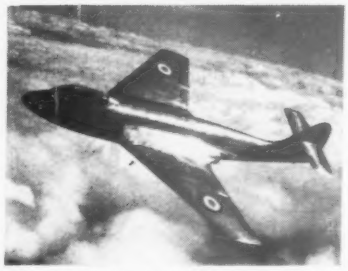

THE COVER: Hawkar P.1052, new British jet, recently flew London-to-Paris in 21 minutes.

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FLYING

DECEMBER • 1949

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THE MAIL BOX

FIVE AIRBORNE SOLDIERS

The five men that Sgt. H. E. Harrington carried into Holland ["On a Slow Rope to Holland," October FLYING] were in my Battery. They were all okay at the end of the war and, I believe, all received a Division medal for their work in getting back to our lines . . .

PFC. DONALD E. SMITH
11th Airborne Division
Camp Campbell, Ky.

WRONG APPROACH

How come Zack Mosley's strip ["Smilin' Zack," October FLYING] shows carrier planes using a righthand pattern? Carrier planes always use a left-hand pattern to avoid the turbulent air behind the island structure.

I had a hard enough time doing it the old way—let's not change the procedure.

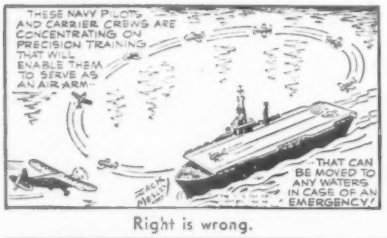
ORVILLE COOK
Los Angeles, Calif.

What advantage does Mosley's right-hand approach have over the old left-hand approach?

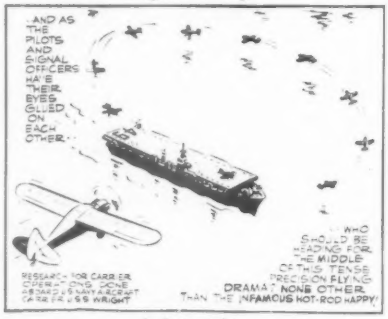
J. BARRETT
Kansas City, Mo.

To my knowledge, the Navy has always used a left-hand pattern on a carrier . . .

LIEUT. (jg) D. D. CROSBY, USN
San Diego, Calif.


THESE NAVY PILOTS AND CARRIER CREWS ARE CONCENTRATING ON PRECISION TRAINING THAT WILL ENABLE THEM TO SERVE AS AN AIR ARM
THAT CAN BE MOVED TO ANY WATERS IN CASE OF AN EMERGENCY

Right is wrong.


AND AS THE PILOTS AND SIGNAL OFFICERS HAVE THEIR EYES GLUED ON EACH OTHER
WHO SHOULD BE HEADING FOR THE MIDDLE OF THIS TENSE PRECISION FLYING DRAMA? NONE OTHER THAN THE INFAMOUS HOT-ROD HAPPY!

Left is right.

● Says Mosley: "When the carrier episode appear in the papers (last May), all scenes, except that particular one, showed planes circling in the correct pattern. We (also) received numerous complaints about this boner . . . Am airmailing copy of correct carrier scene." [see above.]—Ed.

JACK AND GLORIA

Stop me if I'm wrong, but "Smilin' Jack" was not a handsome, *mustached*, free-lance pilot in 1933. He didn't grow the mustache until 1938 or 1939 when he disguised himself as a spy and pulled a stretch on Devil's Island because of mistaken identity.

. . . Next time you have an article by Gloria Heath ["The DeHavilland Beaver," October FLYING], just forget the pictures of planes and concentrate on her. She's even prettier than an F-80—and that's going some.

R. S. SPEIGHT
Dayton, O.

Prettier than an F-80.

. . . Gloria Heath is sure a mighty fine lookin' gal . . .

GUY H. BOGER, JR.
Sanford, N. C.

RENTAL CARS FOR AIRPORTS

Private flying can be quickly and practically aided by Driv-Ur-Self or similar automobile rental service at airports. I hire airplanes and am perfectly happy to continue to do so. But I am mighty provoked to land at an airport 10 miles from my business location and find no available transportation except taxicabs. . . .

GREGORY COOPER
Wayland, Mass.

●For details of a rental car service available at 35 airports, see page 74.—ED.

WHO OUTNUMBERS WHO?

. . . There are about 10 civilian pilots to every two firecan jockeys. And about one out of every 10 of these civilian pilots may some day fly a blow torch. But the rest of us don't ever expect to fly one. Who outnumbers who? I don't have to tell you.

Let [FLYING] do away with the military stuff, and be strictly civilian . . .

PETE J. GIRAUD
Mojave, Calif.

THOSE AIRPLANE PHOTOS

I have been so overwhelmed by replies to my letter in "The Mail Box" column [October FLYING] that I have found it impossible to answer all those who have

(*Continued on page 78*)

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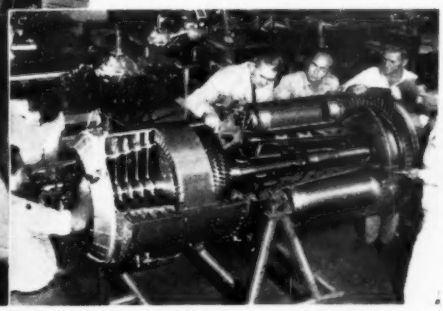
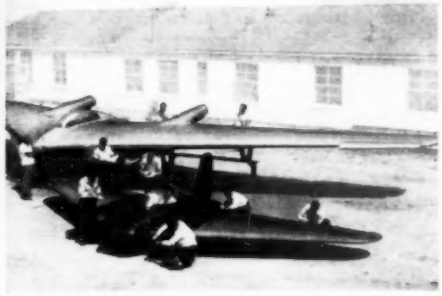
*Based on official Bureau of the Census and Civil Aeronautics Administration figures for 1939, and "Aviation Week" estimates for 1949.



Up-to-the-minute training in Jet Power Plants is one of the many important practical advantages for Northrop students. This group is studying the construction and operation of the powerful General Electric TG-180 turbo-jet engine.



Northrop student engineers learn the principles of advanced all-wing aircraft design, as they study the design and aerodynamic characteristics of a Northrop-built experimental "buzz bomb" (front), and one of the N-9M 60-foot scale model Flying Wings (rear).

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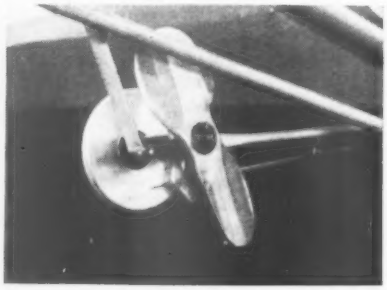
NOTES ON CIVIL FLYING

. . . **Firestone** Tire and Rubber Company has announced development of a synthetic rubber that will bounce instead of shatter at –75°. It is being used for tires, hose, gaskets and belting. Hitherto aircraft tires parked out in extreme cold might develop permanent flat spots. They wouldn't roll until thawed out and made round again.

. . . **Martin Airways,** Monmouth, Ill., has developed a propeller-driven centrifugal sprayer which is mounted under the wings of spray planes. Effective swath is 40 to 60 feet, depending on altitude.



. . . **A new type of runway** has been built at the New Philadelphia, O., Airport with the completion of a 4,000-foot cement-treated base landing strip. This type of base has never been used before on an airport, according to the Portland Cement Association. It reduces the cost of installation by about one-third and retains up to two-thirds of the strength of concrete of the same thickness. The base is constructed by mixing cement and a small amount of water with bank-run gravel and placing it on the runway with spreaders. It is then rolled and forms a rigid slab six inches thick.

. . . **Kansas State Fair** officials built a modern landing strip 2,200 x 300 feet with sod surface in September. More than 200 Flying Farmers used the strip on a single day of the fair.

. . . **The airport picture** in general is encouraging even though many small airports have been unable to survive financially, according to Dr. Leslie A. Bryan, director of the University of Illinois Institute of Aviation. There are now more than 6,000 airports in the United States, and Bryan believes that 7,500 "properly located" would provide a "passably adequate landing area coverage."

. . . **Wellwood E. Beall,** vice president of engineering and sales for Boeing Airplane Company, has warned U. S. manufacturers that the development of future large transport airplanes in the United States may be brought to a standstill unless there is major revision in the present civil certification system. Beall charged that aircraft manufacturers often must spend more than $1,000,000 to certificate commercial planes already built for, accepted, and proved by the Air Force or Navy.

. . . **The Iowa State Aeronautics Commission** has recommended that all crop dusters and sprayers operating in Iowa be equipped with stall warning indicators. Shoulder harness was also stipulated as standard equipment.

. . . **Wisconsin Historical Society** has inaugurated a new type of social flight. On October 16, pilots flew to Nicolet Airport, DePere, under the joint sponsorship of the Society and the Wisconsin Civil Air Corps. The program included special church services, luncheon, and a conducted automobile tour of historic sites in and around Green Bay.

. . . **Mrs. Mildred Zimmerman,** 27-year-old mother, claims a world's altitude record for lightplanes. Late in September she flew to an altitude of 26,200 feet.

. . . **Jet transports** will not be carrying passengers on U. S. scheduled airways until about 1955, according to Carlos Wood, top design engineer of Douglas Aircraft Company.

. . . **A disposable constant-flow oxygen mask,** which will cost about 25 cents, has been developed jointly by the Air Materiel Command's Aero Medical Laboratory and the H. L. Burns Company,

Portland, Ore. The mask is designed to provide a cheap, practical means of passenger safety and comfort for commercial planes and MATS. It is effective up to 25,000 feet and will not replace present standard masks designed for higher altitudes.

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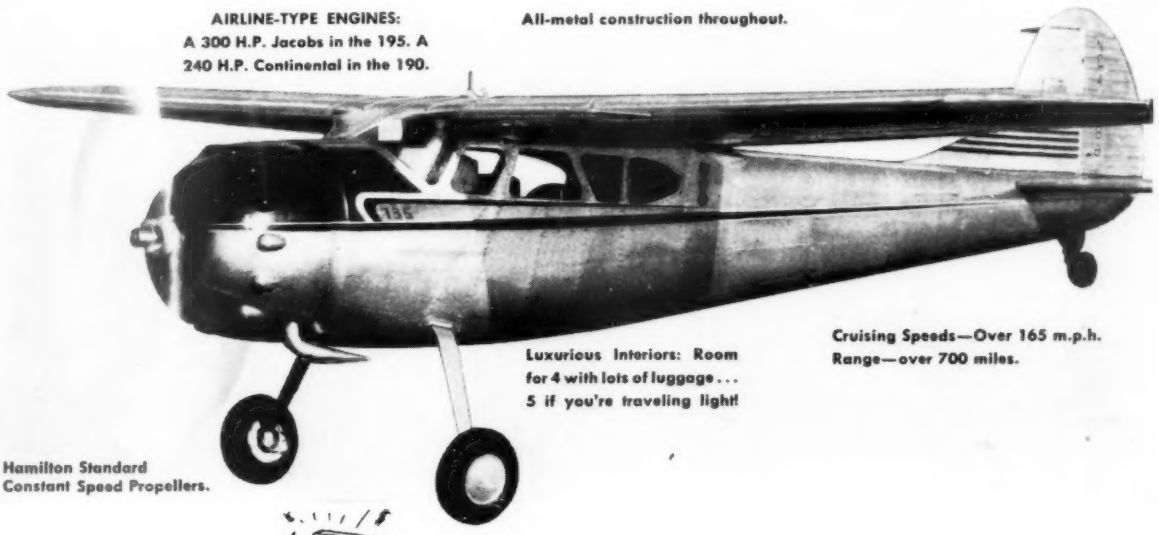

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MILITARY NEWS

. . . **Naval aviation** budget for 1951 may put the fleet air arm on a semi-starvation diet. Number of aircraft may be cut from present 10,483 to 8,000, large carriers from eight to six, light carriers from 11 to eight, large carrier air groups from 14 to nine, light carrier air groups from eight to seven, patrol squadrons from 30 to 20, and Marine squadrons from 23 to 12.

. . . **British fighter** pilots are "as good as any in the world," said U. S. Air Force observers at recent four-day English maneuvers. Latest type Gloster Meteors were pitted against U. S. B-50's at altitudes "approaching" 40,000 feet. The Meteors, reported observers, met the B-50's "on even terms."

. . . **No recruiting** will be attempted by the armed services in event of a future war, according to present plans. Men would be drafted when needed, at times when equipment and training facilities were available.

. . . **Estimated weight** of the atom bomb is approximately 12,000 pounds. A high Air Force official predicted recently that the U. S. would have "within a year" a 12,000-pound bomb that can be guided all the way to the target.

Four J-47 jets (two shown above) add over 20,000 lbs. thrust to 21,000 h.p. developed by B-36D's six reciprocating engines.

. . . **DeHavilland Venom,** new British fighter adaptation of the Vampire, has proved "unusually successful as a maneuverable fighter" at altitudes in excess of 42,000 feet. (See "Britain's New Jet Warplanes," page 32.)

. . . **Boeing Stratojet** (B-47) now has 25 per cent more power than when it set a 3 hr. 46 min. transcontinental record last January. The B-47 is equipped with six GE J-47 turbojets (5,200 pound thrust) instead of J-35 jets (4,000 pounds thrust each).

. . . **Eighty thousand** men will participate in maneuvers off Puerto Rico from January to March, in the largest joint peacetime exercise in Western Hemisphere history. Planes from the Continental Air Command will constitute a mobile tactical air force consisting of two fighter groups, a troop carrier group, a photo recon squadron of jets, and other elements. Navy carriers will be among 162 Naval vessels participating.

. . . **Average age** of aviation cadets in the Air Force is 21.9 years.

. . . **Rumors circulated** in England that the Soviet Air Force has no military planes with a range greater than 1,000 miles have been universally discounted in the U. S. To refute the rumors, one U. S. source points to reliable reports that the Russians have at least 150 heavy bombers copied from the B-29. These planes could have a top range of at least 5,000 miles. Gen. George C. Kenney, a top Air Force strategic bombing expert, said recently that Russia had planes that "could carry an atomic bomb over the ocean."

. . . **Highlights** of recent Navy testimony before House armed services committee:

ADM. A. W. RADFORD, Commander in Chief of the Pacific Fleet: "I don't think the Air Force is trying to take over the Naval air arm; I think they are trying to eliminate it . . . The B-36, under any theory of war, is a bad gamble with national security . . . American taxpayers cannot afford billion-dollar blunders."

REAR ADM. RALPH A. OFSTIE, liaison officer with the Atomic Energy Commission: " . . . strategic air warfare, as practiced in the past and as proposed for the future, is militarily unsound and of limited effect . . ."

CAPT. JOHN H. SIDES, deputy assistant Chief of Naval Operations: " . . . it is folly for any country to stake its future to any great extent on the big bomber and atom bomb."

SEN. BRIEN MCMAHON, referring to Navy testimony against strategic air power: "Now that they don't have the super-carrier, it [the atom bomb] isn't so good."

. . . **Soviet Air Force** has between 14,000 and 16,000 planes and over 600,000 men. One of the 18 Red air armies is composed of medium bombers, the other 17 have the mission of tactical support of ground troops.

AIRLIFT

National security depends largely upon the full use of air power in all its phases. One vital operation is airlift—dramatically pointed up by the air supply of Berlin and more recently by food-rescue missions in the snowbound areas of the West.

Fairchild has developed and produced cargo and troop transports designed for airlift. The C-119 *Packet*, soon to succeed the C-82 *Packet*, will further demonstrate the ability of the aircraft industry to meet the requirements of modern airlift tactics.

An airborne signal team loads jeep and trailer carrying field radio equipment into the cargo hold of a Fairchild *Packet*. Delivered to a forward air strip by experienced Air Force pilots, this unit will provide essential mobile signal service at an advanced base.

FAIRCHILD ENGINE AND AIRPLANE CORPORATION
HAGERSTOWN, MD.

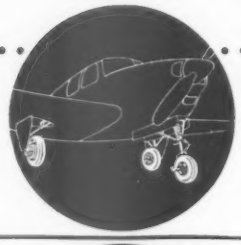
Divisions: Ranger Aircraft Engines, Farmingdale, N. Y. • Nepa, Oak Ridge, Tenn. • Fairchild Pilotless Plane, Farmingdale, N. Y. • Al-Fin, Farmingdale, N. Y.
Subsidiaries: Stratos Corporation, Farmingdale, N. Y. • Duramold Aircraft Corporation, Hagerstown, Md.

Let's look at Beechcraft advantages from the owner's viewpoint

BONANZA

You want speed . . .

The Beechcraft Bonanza cruises at 170 miles per hour at 8,000 feet, using only 56% of engine's maximum rated take-off power. *No engine overload.* Top speed of 184 miles per hour at sea level. (Bonanza performance figures guaranteed.)



. . . but you want strength and ruggedness, too. See how well the ship handles on short, rough fields. See that low, sturdy landing gear with wide tread and struts exclusively cross-braced. No pitching — because of nose gear position and long wheel base. Allows greater braking.

You want high performance

Your Beechcraft Bonanza has a range of 750 miles, a service ceiling of 17,100 feet. You get the extra speed with an extra margin of safety. Carries four people and more than 135 pounds of baggage.

. . . but you want economy, too.

Beechcraft Bonanza fuel consumption amounts to only 9½ gallons per hour at cruising speed. Because of lack of engine overload, there's less engine wear. Seat-mile cost reaches as low as 1¼ cents. Real savings!

You want safety . . .

Tough, sturdy framework gives you safety "plusses." Rated in *utility* category at *full gross weight*, with a limit flight load factor of 4.4 G's, the Beechcraft A35 Bonanza underwent radio controlled dive tests at 275 miles per hour, pulling out safely at 3 G's.

. . . but you want beauty and comfort, too. Exclusive retractable step and limousine door let you enter and leave with ease; preserve feminine dignity! Room to spare for four in the handsome, *sound-proofed* cabin. Maximum 5-way visibility.

Add up all these features—and you have the reasons why the revolutionary Beechcraft Bonanza is a better buy. *See* it today! A note on your company letterhead will bring illustrated brochures describing the Beechcraft Bonanza's many *extra* advantages. Write to Beech Aircraft Corporation, Wichita, Kansas.

Compare these performance features

- Top speed, 184 mph
- Cruising speed, 170 mph
- Range, 750 miles
- Service ceiling, 17,100 feet
- Fuel economy, 9½ gal. per hour

Compare these comfort features

- Exclusive retractable step
- Limousine entrance
- Insulated, sound-proofed cabin
- Quickly removable rear seat
- Luggage compartment accessible two ways

Beechcraft

BONANZA MODEL A35

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

FLYING
VOLUME 45 NUMBER 6
DECEMBER, 1949

The Soviet atomic bomb was not as far ahead of its time table as is generally supposed.

U.S. AIR POWER and the Russian Bomb

By RICHARD SAUNDERS

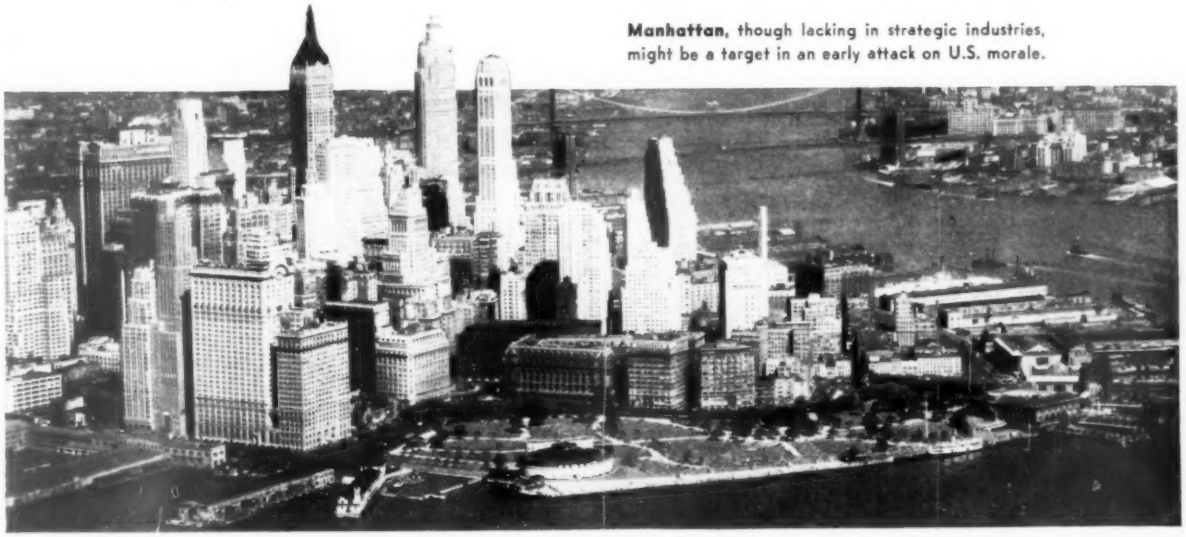
Washington Editor of FLYING

THE DEVASTATING NEWS that the U.S.S.R. has the atomic bomb came like the clap of doom to many persons—even those who were fairly well informed. Yet the Russians were not so far ahead of their time table as is commonly supposed.

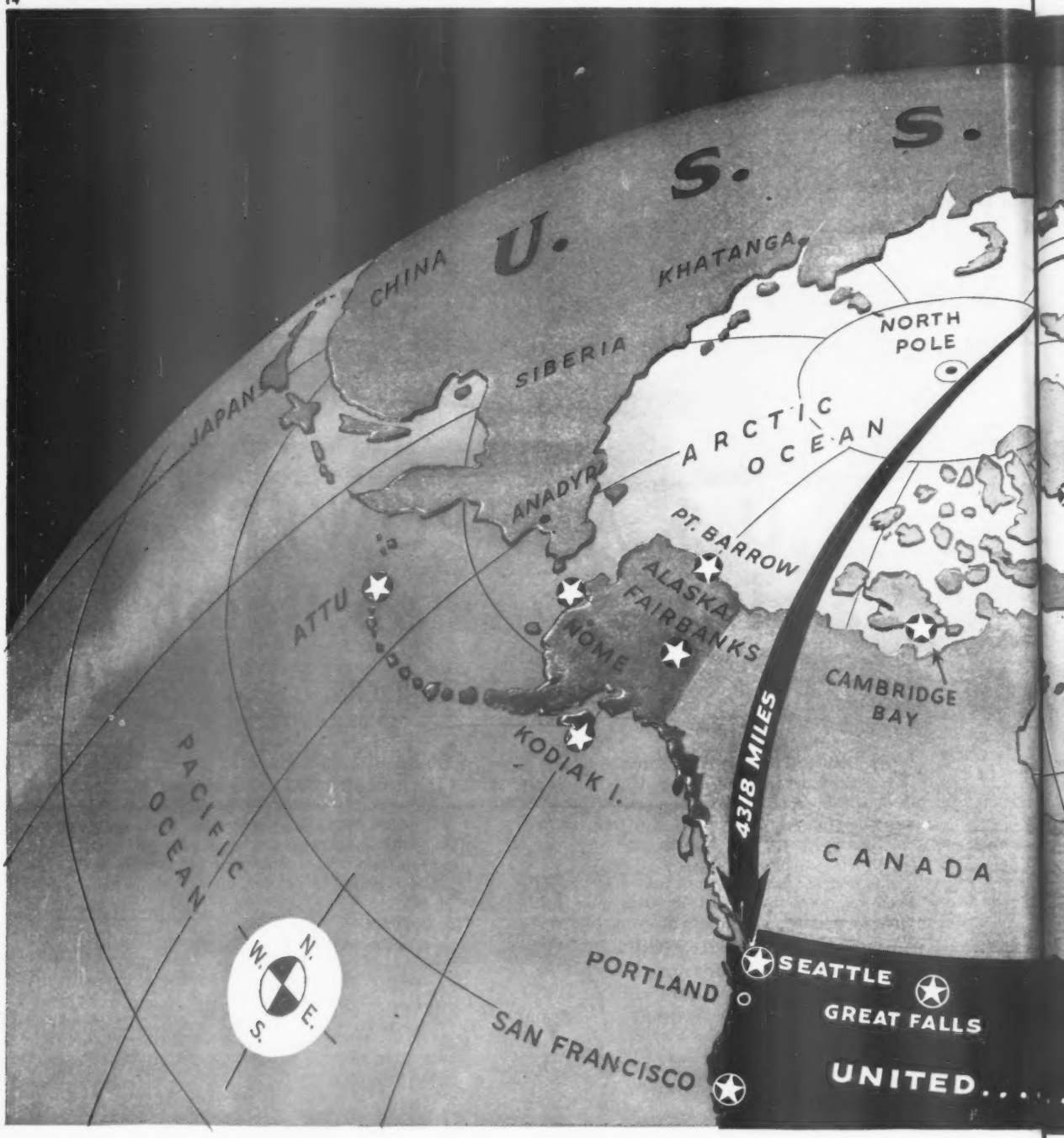
The general assumption of our strategists has been for some time that the Russians would have atomic weapons in quantity by 1952. The President's Air Policy Committee made this date the deadline for building up the Air Force to its recommended 70-group strength. In fact the entire report, *Survival in the Air Age*, (see FLYING, March, 1948) was based upon the premise that other nations would not have atomic weapons in quantity, or the supersonic bombers or guided missiles to deliver them, before the end of 1952.

This assumption still stands.

Our experts still say that the Russians will



Manhattan, though lacking in strategic industries, might be a target in an early attack on U.S. morale.

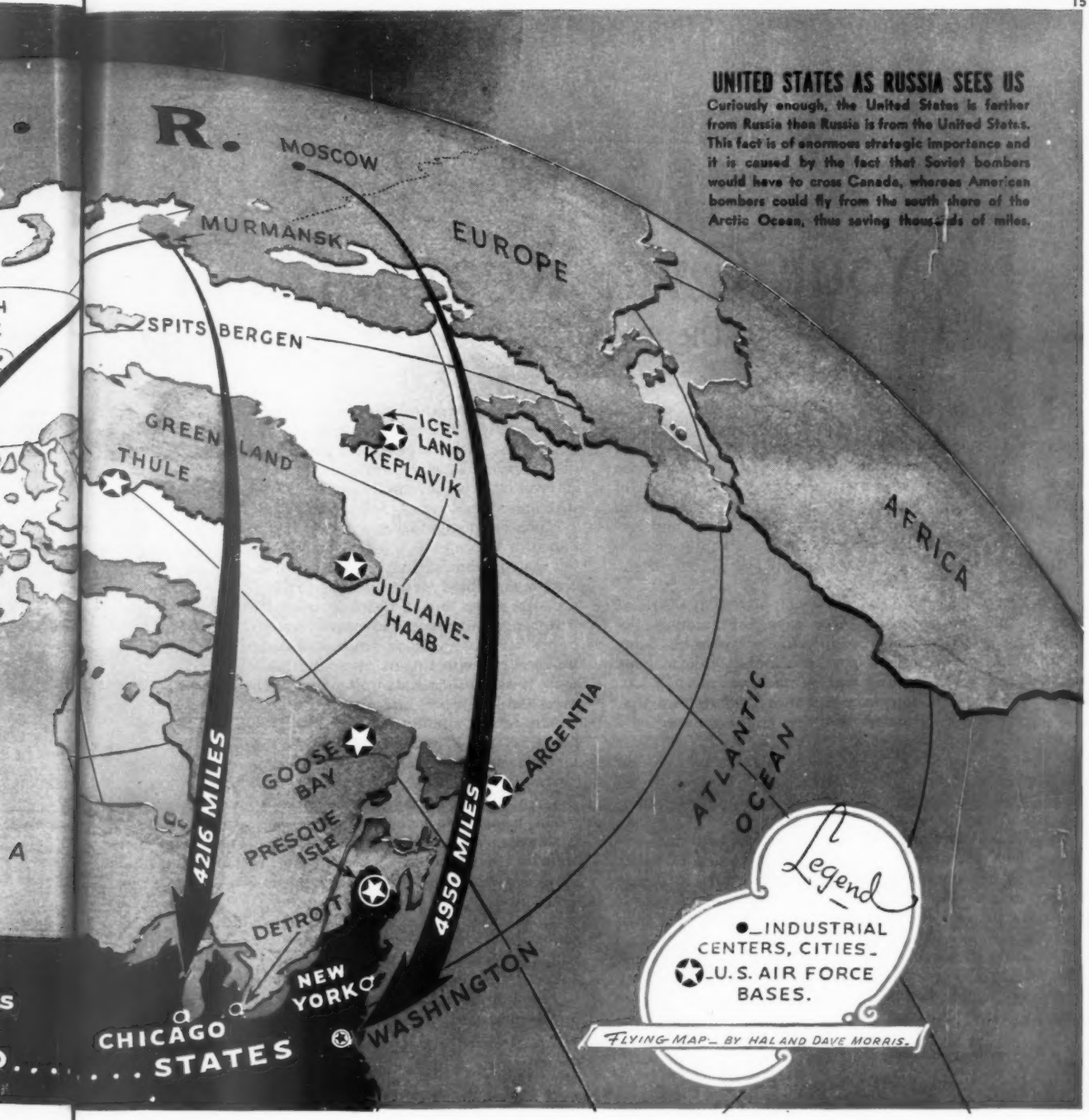


not have the bomb in quantity for three more years or so. Moreover, there is no evidence that they will have the long range bombers to deliver them unless they resort to one-way flights.

What then, is the cause for uneasiness? The answer is not hard to find. It is that the atomic explosion behind the iron curtain a few months ago can be likened to a giant alarm clock. Its hands are ticking off the days and months and years of our soft security. It has already sounded its first warning bell. It has told the nation that the second phase of the atomic age is now here. New concepts and new adjustments are necessary on the home front, for we live in a revolutionary age.

The trouble is that too many folks do not grasp the significance of the alarm. They know that it has sounded but they are not quite sure what it means. Some of the Government agencies in charge of such things as civil defense planning and air raid warning systems are more alive to the situation but they feel that they cannot step too far ahead of the public. In fact many of these plans are farther along than is generally realized. Now that the country is facing up to the new situation confronting it, some of them will be revealed. Others will be kept on ice a bit longer.

In general, the civilian defense activities now being stepped up are based on the premise that if war should



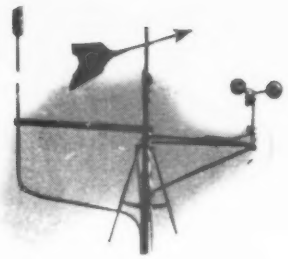
come, it will subject the American home front to a degree of danger never before faced in the history of the country. For the first time, a potential enemy has within its grasp a weapon of sufficient compactness and destructiveness to make the long-range bombardment of U.S. cities pay military dividends.

Russia is known to have a fleet of Tupolev bombers patterned after seized American B-29's. These planes have a range of 4,000 miles—perhaps 5,000 in a pinch. From bases in Siberia and along Russia's Arctic shoreline they could reach virtually every part of the U.S. by flying over the top of the world. No major city or other strategic target could escape.

Of course the raids, if they come, would have to be of the no-return type. But what of that? Except for their own skins, Stalin and his cronies have never held human life in high esteem. They would cheerfully gamble enough airmen to give America an atomic blitz if it fitted in with their plans. The crews could bail out or land after they had dropped their bombs, or dive against a final target like the Jap *Kamikaze*. In the past war, fanatical Russian pilots dived to destruction against enemy warplanes.

Whether enough Russian planes to cause much damage could get through our defenses is something our military men are not willing to speculate about in public statements. Nevertheless, the damage (*Continued on page* 74)

This remarkable article will help you to forecast the weather for yourself



Be Your Own Weatherman

By DR. IRVING P. KRICK

Aircraft owner and pilot, and President, American Institute of Aerological Research

THE brig *Charles Heddle*, sailing in the Indian Ocean in 1845, was caught in a powerful hurricane. With no knowledge of the structure of such a storm or what course to steer to avoid the destructive winds, she chose to run dead before the wind, apparently in the hope of outrunning the hurricane. The circular structure of the storm, however, carried her around the center, and because of the spiral inflow of air towards the center of such storms, she completed her first circuit a little nearer the center than when she started.

The *Charles Heddle* somehow completed five similar trips around the center in three days, continuously encountering violent winds and suffering considerable damage. Then, fortunately, she was no longer able to keep up with the hurricane and was left behind.

Only the pilot who has been caught in bad flying weather with no knowledge of where he might find improving conditions can fully appreciate the plight of the *Charles Heddle*. But any pilot with some basic meteorological knowledge combined with his own weather observations can provide himself with a satisfactory personal weather forecast at any time.

He will probably make mistakes but these will decrease with experience and he can be consoled by the mistakes of others more experienced than he. Pilots fortunate enough to be able to use the services of a professional meteorologist can augment these services with their own observations.

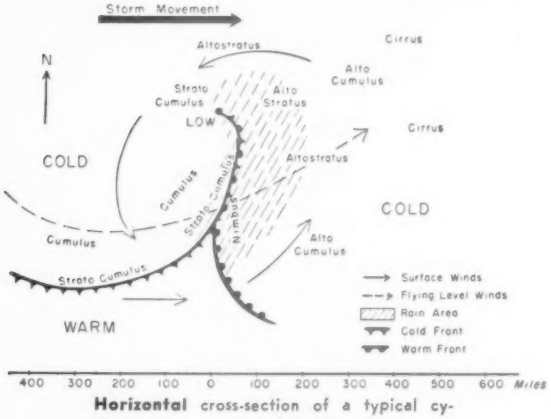
The study of weather forecasting can be traced far back into the early days of man's history. With no rapid intercommunication between distant points early man was forced to study the sky, wind directions and clouds and to establish from these observations various rules in order to foretell weather changes. With the advent of the barometer in the 17th Century and the established relationship of air pressure to weather conditions, the emphasis in forecasting was gradually shifted to the reading of this instrument and away from observing signs in the sky.

Much of this emphasis still remains today in the abundance of barometers used in homes as weather forecasting instruments. Later, collections of surface air pressure readings enabled meteorologists to delineate high and low pressure areas and to begin to trace their movements.

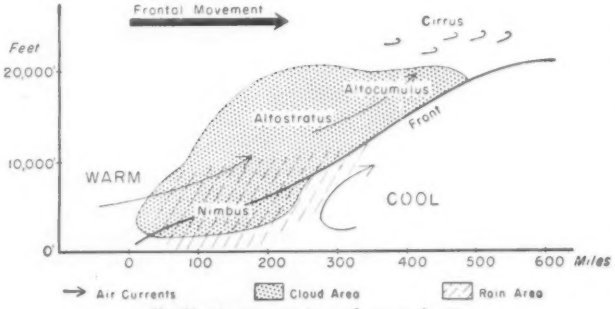
Recent instrumental advances have brought surface and upper air observations from a wide area of the world into central collecting points with little loss of time. From these observations meteorologists have been able to determine the horizontal and vertical structure of the weather which affects our normal life. With some knowledge of this structure anyone can determine by means of his own observations the typical weather development affecting him and, knowing roughly how such developments usually move, may make his own 24-hour weather forecast.

The typical storm or cyclone affecting North America is an area of relatively *low* barometric pressure (L) characterized by winds near the surface of the earth which blow counter-clockwise around the low pressure center. Thus directly east of the low center (in the "3 o'clock" position) the surface winds blow from the south and to the north of the center ("12 o'clock" position) the surface winds are from the east.

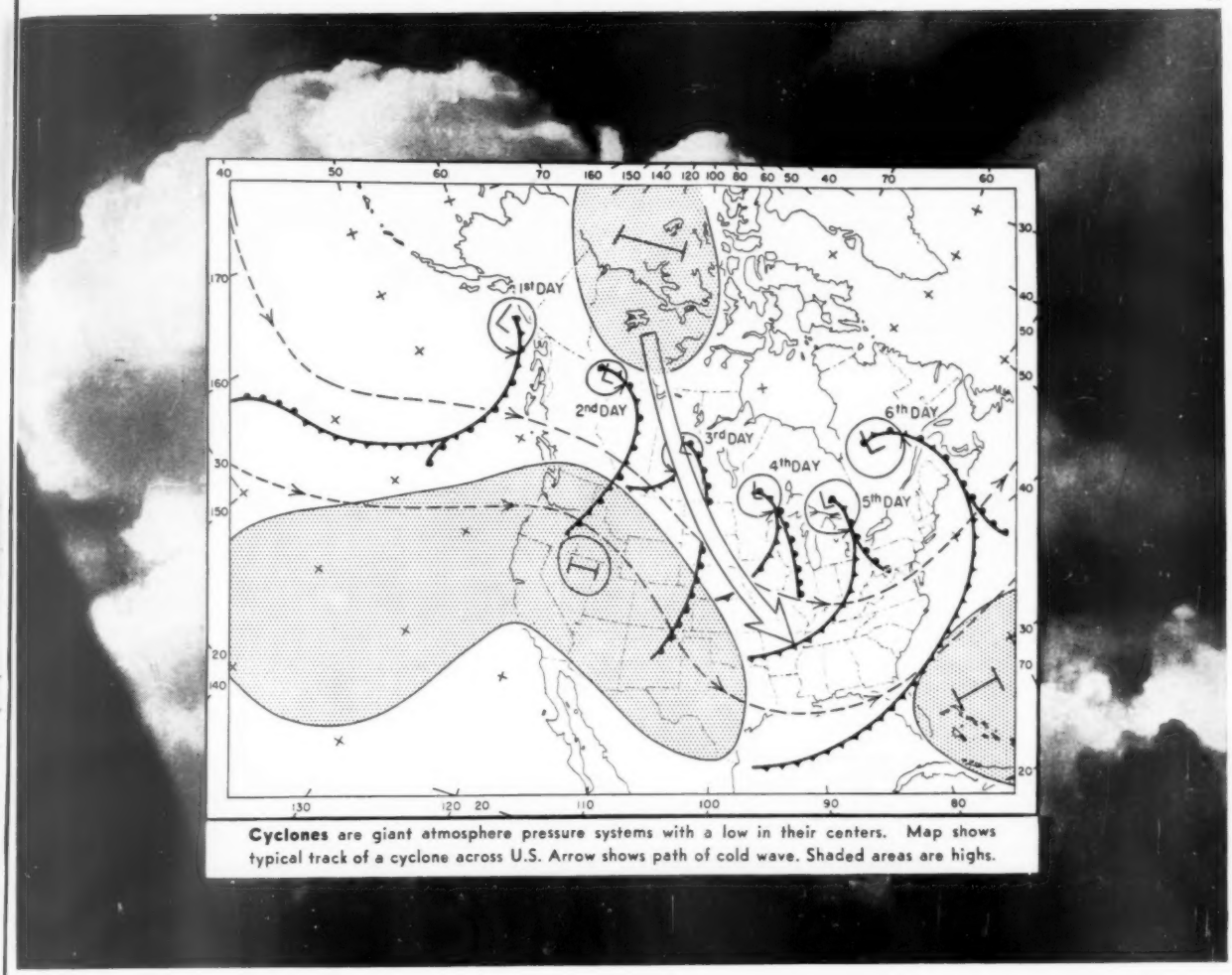
From this comes the familiar rule—if the observer stands with his back to the wind, the low pressure area is to the observer's left, higher pressure to his right. Using



Horizontal cross-section of a typical cyclone and its associated weather phenomena.



Vertical cross-section of warm front with its associated cloud formations.

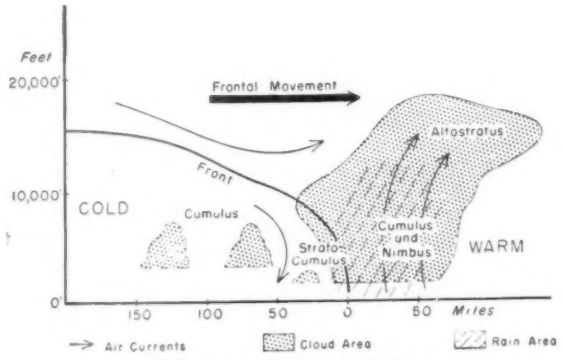


Cyclones are giant atmosphere pressure systems with a low in their centers. Map shows typical track of a cyclone across U.S. Arrow shows path of cold wave. Shaded areas are highs.

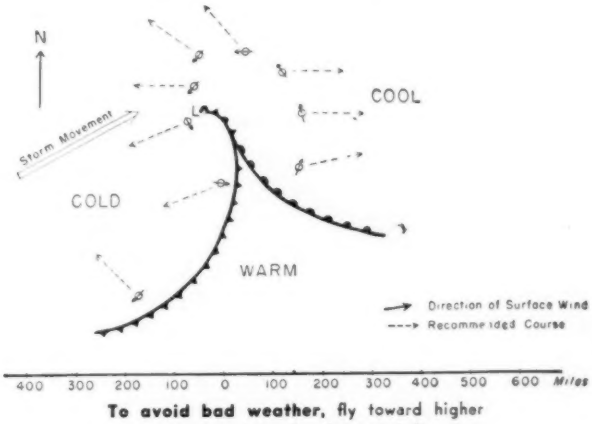
this simple, single observation the observer has immediately determined the direction to the nearest low pressure center although he has not yet any indication of his distance from the center.

In recent years it has been found that the normal cyclone is divided into distinct sectors. These sectors are separated by narrow zones in which the characteristics of the air change abruptly. They are usually designated as warm, cool and cold depending on the temperature of the air within the sector. In the United States, the warm sector usually lies to the south of the low pressure center, the cool sector to the north and east of the center, and the coldest sector to the west of the low center.

The zones separating these sectors are sloping surfaces intersecting the ground in narrow regions a few miles wide but hundreds of miles in length. They are called



Vertical cross-section of cold front with its associated cloud formations.



To avoid bad weather, fly toward higher pressure and to right of surface wind direction.

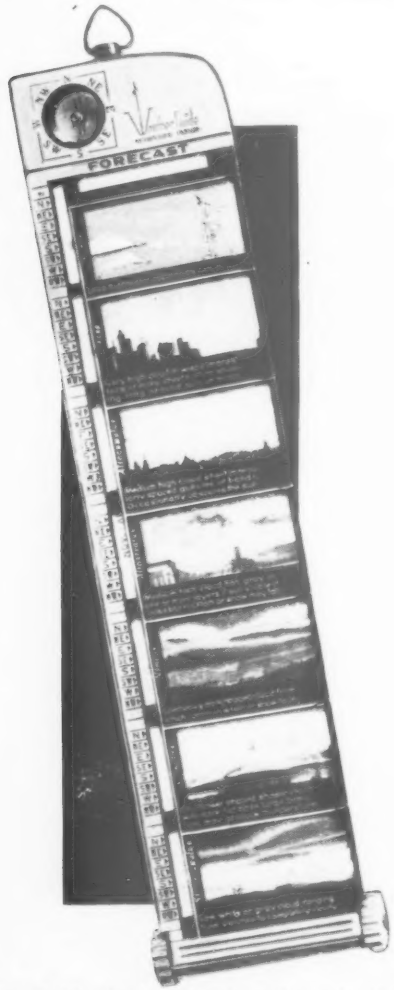
fronts. A typical frontal zone may extend from a low pressure center in Canada through the United States and into Mexico.

Warm and cold fronts are distinguished by the direction of movement of the front. When the front is moving toward the warm sector, the boundary is called a cold front, and when the front moves away from the warm sector the boundary is called a warm front. The effect of these fronts in producing the weather is highly important.

At the cold front the heavy (dense) cold air pushes under warm (less dense) moist air, lifting (and thus cooling) the air in the warm sector until it condenses to form clouds and possibly precipitation.

At the warm front the warm, light, moist air in the warm sector, moving faster than the front itself, is unable to displace the heavier, cool air underneath the frontal boundary and is lifted up along the warm front, again condensing to form clouds and possibly precipitation.

Since the cold front is usually steeper than the warm front, the upward moving air currents in the warm sector ahead of the cold front boundary are more intense than those produced over the gently sloping warm front. The smaller slope of the warm front also causes cloud and rain areas to extend to great distances ahead of the ground intersection of the warm front while the steeper cold front concentrates its cloud and rain systems into a relatively short distance on either side of its surface position.



Weather Guide, developed by the author and sold by the American Optical Company, makes automatic local forecasts.

Clouds associated with the air currents of a cyclone and their zones of separation appear to exist in an infinite variety of shapes and sizes. There are, however, only a few basic types. The large variety is produced by minor variations in the shape and by combinations of some of the fundamental types.

Probably the most important factor in making personal weather forecasts is the rapid identification of the prevalent cloud type or types. The cloud type gives the practiced observer full details on the moisture content, vertical air currents, flying level winds, etc., which characterize the region of the atmosphere in which the weather is being formed.

Cloud observations are of particular importance to the pilot since they give him information on flying conditions in the very part of the atmosphere in which he is most interested. In addition, sequences of cloud observations follow particular patterns with the approach or departure of storm systems. Recognition of these sequences enables the observer to locate himself with respect to the storm and thence to form his opinion of what changes in the weather will occur.

The first harbingers of the approaching low pressure system are the thin wispy cirrus clouds composed of ice crystals and usually formed at altitudes of 20,000 to 35,000 feet. In their thickest form, the cirrus may exist as a milky sheet causing the familiar halo around the sun or moon. These clouds are formed some 600 to 800 miles ahead of the low pressure center along a zone where the sloping warm front on the forward side of the system reaches its highest altitude.

As the low pressure area approaches, the moisture in the upper levels of the atmosphere increases, and the cirrus formations usually give way to altocumulus clouds. These are denser clouds which may occasionally obscure the sun and appear as regularly spaced globules or bands. The altocumulus clouds occur around 400 to 500 miles ahead of the approaching low pressure system and thus at a lower altitude along the sloping warm front. They range in height from 14,000 to 20,000 feet.

Two hundred to 400 miles ahead of the cyclone, the altocumulus clouds thicken, appear in increasingly large patches, and gradually coalesce to become altostratus clouds. These are still lower, at altitudes of 10,000 to 15,000 feet, are flat and gray in character, and may occur in one or more layers. If visible, the sun appears blurred in contrast to the halo formed with the cirrus cloud sheet. The first light rain or snow from the approaching storm may fall out of the altostratus cloud deck.

Closer to the low pressure system, the altostratus clouds thicken, become darker and their bases come lower as the observer nears the point where the sloping warm front intersects the surface of the earth. When continuous rain or snow is falling out of low, heavy, dark, ragged clouds, they are called nimbus clouds. Often isolated patches of cloud appear below the level of the main cloud sheet. Ceilings under this type of cloud may, at times, be reduced to zero.

If the center of the cyclone passes close and slightly to the north of the observer, continuous rain or snow is finally terminated as a showery type of precipitation with the passage of the cold front. Within about 100 miles on either side of the cold front the typical cloud formations are of the cumulus type. These are cauliflower-shaped shower clouds with dark flat bases. Particularly large formations may produce thunderstorms. In the immediate vicinity of the cold front nimbus and cumulus often appear simultaneously, making the cauliflower-shaped tops of the cumulus difficult to observe from the ground.

If the center of the cyclone (*Continued on page* 69)

Cirrus clouds are very high wisps or milky sheets. Often form halo around sun or moon.

Altocumulus is medium high sheet in regular globules or band that occasionally hides sun.

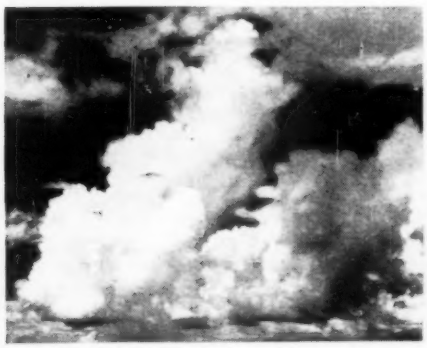
Altostratus is medium high, flat, in one or more layers. Light rain or snow may fall.

TABLE OF 24 HOUR FORECASTS MADE FROM SURFACE WIND AND CLOUD OBSERVATIONS

SURFACE WIND	CLOUDS						
	CLEAR (Less than ¼ sky cloud-covered)	CIRRUS	ALTOCUMULUS	ALTOSTRATUS	NIMBUS	CUMULUS	STRATOCUMULUS
NW	Clear	Fair	Clearing	Clearing	Showery then clearing	Clearing	Slow clearing
W	Generally fair	Increasing clouds	Slow clearing	Slow clearing	Showery then clearing	Slow improvement	Slow improvement
SW	Increasing clouds	Increasing clouds	Increasing clouds possible stormy	Cloudy possibly stormy	Stormy then improving	Possible showers then clearing	Showery then clearing
S	Increasing clouds	Increasing clouds	Increasing clouds then stormy	Increasing clouds then stormy	Stormy then improving	Showery	Stormy then clearing
SE	Increasing clouds	Increasing clouds	Increasing clouds then stormy	Increasing clouds then stormy	Stormy	Probable showers	Cloudy then stormy
E	Fair	Increasing clouds	Increasing clouds	Increasing clouds	Stormy then cloudy	Possible showers	Little change
NE	Clear	Fair	Cloudy then slow clearing	Cloudy	Slow improvement	Slow improvement	Slow improvement
N	Clear	Fair	Slow clearing	Slow clearing	Slow improvement	Improving	Improving

The above forecasts are based on weather sequences associated with cloud and wind observations observed in a typical cyclone. These sequences will vary in different parts of the country. After experience in developing such forecasts the local variations will become apparent.

Nimbus is low, dark, ragged. Rain or snow falls continuously. Turbulence is moderate.



Cumulus is cauliflower-shaped shower cloud with dark flat base. Can cause thunderstorms.

Stratocumulus is low and white or gray, ranging from patches to a complete overcast.

Ill-fated B-17 before its last mission in September, 1943.

Crew members were, left to right (standing), Carmine A. Gallo, radio operator; William R. Freund, co-pilot; Sam R. Turner, pilot; Morris Weinberg, navigator; Vance R. Boswell, bombardier; (kneeling) Carter Thornton, gunner; Harold W. Smith, engineer; Norman F. Brett, gunner (later replaced by James Speakman); Joseph F. Moloney, gunner (deceased); DeWitt Weir, gunner.

Battered bomber was hauled out of Boden See a month after it went down. The original caption penned on the back of this photo was: "It's hard to believe nine men came out of it alive."

The story of nine men—and a mission you'll never forget

Combat Christmas, 1943

By Capt. SAM R. TURNER

THE HARSH and unwelcome voice of the Operations Clerk, startled us from a sound sleep, about 12:30, on the morning of September 6, 1943.

Too sleepy to eat, I wandered over to the briefing room. I heard someone say, "Hope this one isn't back to the 'Valley.'" I knew just what he meant, for I had been on that raid to Bonn, Germany. One sergeant yawned, and muttered, "Why in the hell can't they fight this war in the daytime!"

In a short while, the Intelligence officers for our group (351st Bomb Squadron, 100th Bomb Group) began to drift into the rapidly-filling room.

Then the briefing officer stepped up to the map and slid the cover aside. Lord! I thought that my heart would stop. Fellows all around me began to stir uneasily in their seats. They had a red ribbon that marked the route we were going to take to the target—the ball bearing factory at Stuttgart, Germany. And that route led us right through the heart of the German fighter-belt.

Each of the briefing officers gave us the information that he specialized in, from flak to the target itself. After the navigation officer gave us a time "tick" for our watches, I moved along with the other pilots to the special briefing that the "Old Man" had for us. None of us

Interned crew-mates carry flag-draped casket of turret-gunner Joseph Moloney to English cemetery in village of Bad-Ragaz.

In November, internees were moved to a small resort town in the mountains. Each afternoon, with the aid of an instructor, they learned to ski. Weinberg and Freund (right) are shown on ski-run.

was too happy about the coming dawn and we showed it. I was particularly burned up because it was to be my day for a pass to London.

After the briefing was over, I went out into the still-dark night, and caught a truck out to my B-17, *Raunchy*. When the crew had finished cleaning their guns, we went into a tent and sat down. Some of us lit another cigarette, while others just sat there staring through the tent flap at the searchlights.

The belly gunner, Joe Moloney, turned to Morry Weinberg, the navigator, and said, "Guess you had better pay me that five pounds I won from you last night."

"Hell, we're coming back. Haven't we come back from all the rest okay?"

The sun was just beginning to come up at 5:00 o'clock when we started the engines. You could hear their muffled roar all over the field, as the pilots revved them up. At 5:30, the lead ship taxied by in front of us. We waited until our turn came and after releasing the brakes moved forward to take our place in the line of *Forts* taxiing down the perimeter. At the scheduled time, the lead ship poured on the coal and moved (*Continued on page* 64)

WHERE ARE THEY NOW?

Sam R. Turner
Pilot

The author was repatriated early in 1944. After his discharge in September, 1945, Turner worked at various jobs in his hometown, Orlando, Fla. Recalled to active duty last year, he now is a special service officer at the Davis-Monthan AFB, Tucson, Arizona.

William R. Freund
Co-pilot

Disguised as a Swiss civilian, Freund was smuggled into France by the Underground in September, 1944. He was released from active duty in August, 1945. Now an insurance claim adjuster in Syracuse, N. Y., Freund is married, has a three-year-old son.

Morris Weinberg
Navigator

Weinberg escaped from Switzerland in January, 1945. Since release from duty in November of the same year, he has been connected with a home furnishings firm in Indianapolis. As this issue goes to press, Weinberg and his wife expect a new addition to the family.

Vance R. Boswell
Bombardier

Boswell, who lost his left eye on this mission, escaped from Switzerland in January, 1945; spent the next eight months in a U. S. hospital before being discharged. Now studying to be an optometrist in Forrest Grove, Ore., he will receive his doctor's degree in June, 1950.

Harold W. Smith
Engineer

After returning to the U. S. in December, 1944, Smith took an Air Force course in electricity, was discharged in August, 1945. He is now employed as an electrician with General Motors in Columbus, O. Smith is married, has three children.

James E. Speakman
Gunner

Another escapee, Speakman was smuggled out of Switzerland in October, 1944. After discharge in 1945, he re-enlisted in the Air Force for another two years. At present he is attending the Arkansas State College in Jonesboro, Ark.

FLYING was unable to locate crew-members Gallo, Thornton and Weir.

1 **Corsairs** flown by Marine reservists strafe beach defenses ahead of landing craft during recent large-scale maneuvers.

2 **Dose of strafing** keeps "enemy" pinned-down just before the amphtracs rumble onto the beach with the first assault wave.

3 **Amphtracs,** with Marines crouched inside, move slowly toward dunes in last summer's maneuvers. Corsairs stay close overhead.

Leatherneck Air Force

Tough, intact, the Marine air arm has just one job: to give close support to the troops on the ground.

By WILLIAM WELSH

IN THE late 1930's Americans either laughed or grimaced as their friends told the story about people who live off the fat of the land. Seems the only ones who could do it besides the WPA were the corset manufacturers.

Ten years and a world war later, Americans have forgotten the WPA—but the joke and the corset manufacturers are still around. Defense Department workers now ask their friends: "Know what gives more support than a corset? Marine Aviation."

Unlike WPA employees of the Roosevelt era, Marine aviators of today take no exception to the kidding. They agree with it. If anything, they are disturbed that *any* comparison can be made to the role they play. Like the corset manufacturers, Marine aviation came into being through a need for support. Its existence today is still dictated by the need for air support on the part of Marine ground troops. No other incentive spurs Leatherneck flyers.

Responsible only to a relatively small fighting ground force, the tough, intact Marine air arm doesn't have to worry about strategic bombing. A "strategic-minded" aviator can check in his Marine buttons.

When the Marine Corps makes an amphibious landing, ground troops count on the planes for three things:

- The man on the ground wants to know he won't be attacked from the air. Marine fighter planes must assure air superiority in the area.
- In military vernacular, the field of battle must be isolated. This means attack planes must strike nearby enemy staging areas and air bases. The enemy must be denied the opportunity to pour reserve strength into the combat area.
- The guy with the Browning Automatic Rifle needs air support to help pave way for his advance. Fighter-bombers must strafe, rocket and bomb into submission enemy pillboxes, artillery and entrenchments.

The boss-man of Marine aviation is Maj. Gen. William J. Wallace who serves both as Assistant Commandant of the Marine Corps for Air and as Deputy Chief of Naval Operations for Marine Aviation. He (*Continued on page* 76)

4 **Support waves** splash through surf, under cover of planes, to reinforce troops that rode amphtracs up to line of dunes.

5 **Roaring inland,** Marines attack "enemy" installation, calling on fighters to help pave way for the advancing troops.

By HY SHERIDAN
Contributing Editor of FLYING

Aviation's Silliest Dilemma

New airline refrain is: "How Yuh Gonna Get 'Em Down on the Ground?"

THERE IS NOT much danger from fire on airliners but, on rare occasions when there is one, it makes the headlines. The effect on traffic and profits is far beyond the truth of the hazard. It is a difficult thing to make people realize the statistical fact that they are safer in an airliner than in their own bathrooms.

I think it is useful, nevertheless, to set down here the slightly exaggerated report of a friend whom I shall call Jim. Jim also happens to be an airline pilot and he is against low-wing airplanes. Jim believes that airliners ought to be high-winged and can marshal a good many arguments to support his opinion. One of these is the fire hazard in a low-winged airliner.

Let's suppose (says Jim) that you have caught on fire in the air and landed, or you had a nose-wheel failure, or slid off the runway, or over-shot and caught fire.

So you are on the ground and you are on fire and you want to get the passengers out. You have a problem, my friend.

You can't step out of a low-wing airliner to the ground because it is so high up in the air. That first step is the trouble, it is a biscuit, as we girls say, being ladies. The door sills are around 10 feet off the ground and if you don't get the feel of how high that is you have but to stand in the passenger door of one of the modern airliners and you can look level into the eyes of a man standing in the second-story window of the terminal office building. Should you be in doubt about how it feels to get out of one of those planes and don't have any around handy, why, all you have to do is jump out of the second story of an office building and the idea will be impressed upon you, including any lettering that happens to be in the

"When his hands began to smoke he let loose, but his legs held on and his skull fetched the concrete a manful whack."
FRANK ADAMS

"Not only is the gesture not dignified but no lady wants to be in such a position faced by four men."

CARTOONS BY FRANK ADAMS

sidewalk, or anything else you happen to light upon.

The designers know how high the new airliners are, all right. One of the things that they anticipated was that the pilot would, while sitting perched in his dizzy cockpit, have plenty of occasions to talk to some mechanic on the ground on some such subject as which do-dads were working and which were not and, so help me, they put in a telephone so that the pilot and the mechanic could hear each other.

Let's see . . . where were we? Oh, yes, getting the hell out of the burning airliner. With all that gasoline aboard or running around on the ground, none of you is loitering. You proceed with some gusto, as do the passengers. In a word, you are fired with ambition.

Only an athlete can jump from that door without hurting himself so an ordinary passenger can't get away from the plane and he might as well have stayed inside. Noting the sporting condition that such a situation would bring about, the designers began to think of what they should do about it, and one of 'em had seen a ladder once, and he told the other engineers and they got together and designed a ladder which was a fine job and had steps and everything and they were duly proud of themselves, but when they tried to put the ladder into the airplane it wouldn't go; it was too big. So they were not stumped, no sir; one of them had seen a magician in a night club and the magician had a cane and he would hold the cane up and all of a sudden it would (*Continued on page* 72)

HOW TO KEEP THAT 'NEW LOOK'

Keep it clean. Under normal conditions, fabric-covered planes need wash job at least twice a month. Use warm water and suds, then rinse.

rinse.

Are you a good plane owner? Some simple checks can add years to your craft's life.

By GILBERT C. CLOSE

TWO IDENTICAL used airplanes—same make, same year, same model—parked side by side on a southern California sales lot, wore price tags $500 apart. At first glance there seemed nothing unusual in this situation. One plane was in much better condition than the other. The surprise came when the log books were examined. The high-priced airplane, the one obviously in good condition and reeking "airworthiness" from prop hub to tail wheel, had been flown 200 hours more than its beaten-up counterpart.

Neither airplane had been cracked, both had received periodic inspections and overhauls, both were certified. The difference in price, or so it seemed at first glance, was based on appearance. The high-priced airplane still wore its "new look." The other craft showed the accumulated shoddiness caused by lack of proper care.

But closer inspection soon revealed that the price difference between the airplanes would still be unlikely to induce a preference for the cheaper plane. The fabric of the low-priced model was frayed in several places and had lost its tautness. The shock cords on the landing struts were flabby and oil-soaked. The windshield and cabin windows were yellowed and had begun to craze. Looseness in the controls spoke of worn bell crank pulleys. The wooden propeller was pitted and slightly out of track. "Ringworms" and peeled paint and dope gave all fabric surfaces a pox-like appearance and offered an unclean aerodynamic surface to reduce air speed and consume more fuel.

None of the cheaper airplane's defects were sufficiently serious to cause revocation of its airworthiness certificate. Yet all the defects taken together were converging in that direction. The only remedy was a series of expensive repair jobs that would undoubtedly total more than the $500 difference in price.

The sad part was that every defect noticeable on the cheaper airplane could have been prevented by proper care. Not a single one of these preventive maintenance jobs would have required a licensed mechanic. The pilot owner could have accomplished them easily with a moderate expenditure of time and without danger of violating CAR.

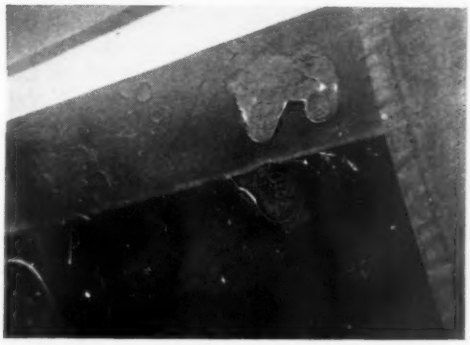
Preventive maintenance applied in time to check deterioration before it becomes serious has many advantages besides keeping up resale value and appearance. Proper care of the airplane will reduce repair bills and facilitate inspections. Safety is increased. Clean, undented and taut aerodynamic surfaces help maintain top air speed and reduce fuel consumption. The operating life of the airplane is materially lengthened.

The pilot-owner must remember that preventive maintenance is his own responsibility. During daily or pre-flight inspection of the airplane, he should note all minor defects and mark them for early attention. The defect may not seem serious at the time but most defects are progressive in nature. They keep getting worse if left untended.

No part of the average lightplane requires more attention from the pilot-owner than the various fabric-covered surfaces. The fabric material itself has very little resistance to dampness, mold or chemical attack, nor has it sufficient strength to remain taut during service. In fact, the qualities of the fabric as a covering material would be useless without the (*Continued on page* 68)

DON'T LET THIS HAPPEN TO YOUR PLANE

Cloudy plastic windshield results from long exposure to sun and from carelessness in cleaning.



'Ringworm' on fabric fuselage surface requires immediate refinishing to forestall deterioration.

Peeled dope on wing's leading edge results in early damage to exposed portions of the fabric.

Small puncture in the fabric covering of cabin door permits moisture to attack dope from rear.

Cessna 140A

By BEN ROBIN

IT ISN'T often that you can check a new plane and find that it surpasses the manufacturer's claims, but the cruise and climb performance of the all-metal 1949 Cessna 140A makes the builder's claims seem modest.

The new Cessna has an all metal semi-cantilever wing which is tapered, but maintains about the same area as earlier fabric airfoils. Wing loading per square foot is practically identical with that of the fabric wing. Span, however, has been increased six inches to 33 ft. 10 in.

Wing tips are interchangeable and in case of damage may be replaced independent of the wing proper.

Ailerons cover the entire trailing edge of the wing from the beginning of the taper to the tip. This added area not only increases lateral control, but also makes possible perfect aileron control throughout all stall maneuvers.

The tapered wing gives greater flap area than earlier 140 designs. Flaps are larger and travel to a 43° deflection angle. Forward visibility when approaching the runway for a landing is excellent over the low nose position, and the flaps are now equipped with an automatic up gust lock.

Perhaps the most noticeable difference in this year's plane is the single strut supporting the wing. All previous model 140's had two wing struts. By removing one strut and adding the tapered wing. Cessna has lessened drag and increased performance. This means higher cruising speed and greater range.

The single strut has necessitated a new type door catch mounted on the under side of the wing. When the door is swung open, the catch fastens automatically to a fitting at the top of the door.

Also, because of the single wing strut fastening to the fuselage, the gear has been moved three inches forward on the new plane. This provides strong internal bracing at the right point for both gear and wing. The 140A sets down softer and easier than previous models and, even more important, you can't nose the plane over.

FLYING's CHECK PILOT

EDITOR'S NOTE

This series of articles is planned to help the pilot and prospective plane owner evaluate aircraft now on the market. Only aircraft holding a CAA Type Certificate are flown. The authors evaluate each aircraft through the eyes of the average private pilot who flies an airplane for business or recreation.

CESSNA 140 A

1949 Specifications With McCauley Propeller

Engine: Continental	90 h.p.	85 h.p.
Wing span	33 ft. 4 in.	33 ft. 4 in.
Length	21 ft. 6 in.	21 ft. 6 in.
Gross weight	1,500 lbs.	1,500 lbs.
Empty weight	900 lbs.	900 lbs.
Wing loading	9.75 lbs./sq. ft.	9.75 lbs./sq. ft.
Fuel capacity	25 gals.	25 gals.
Top speed	Over 125 m.p.h.	Over 120 m.p.h.
Cruising speed	Over 110 m.p.h.	Over 105 m.p.h.
Landing speed	41 m.p.h.	41 m.p.h.
Cruising range	4½ hrs.	Over 4½ hrs.
Service ceiling	15,600 ft.	15,500 ft.
Rate of climb (sea level)	690 ft. per min.	680 ft. per min.
Height	6 ft. 3¾ in.	6 ft. 3¾ in.
Wing area (inc. fuselage)	159.6 sq. ft.	159.6 sq. ft.
Power loading (per h.p.)	16.7 lbs.	17.6 lbs.

Source: Cessna Aircraft Company, Wichita, Kans.

Tapered wing on 140A has more flap area than last year's model. Note single strut, which helps lessen drag. Span is 33 ft. 4 in., length is 21 ft. 6 in. Empty weight is 900 pounds.

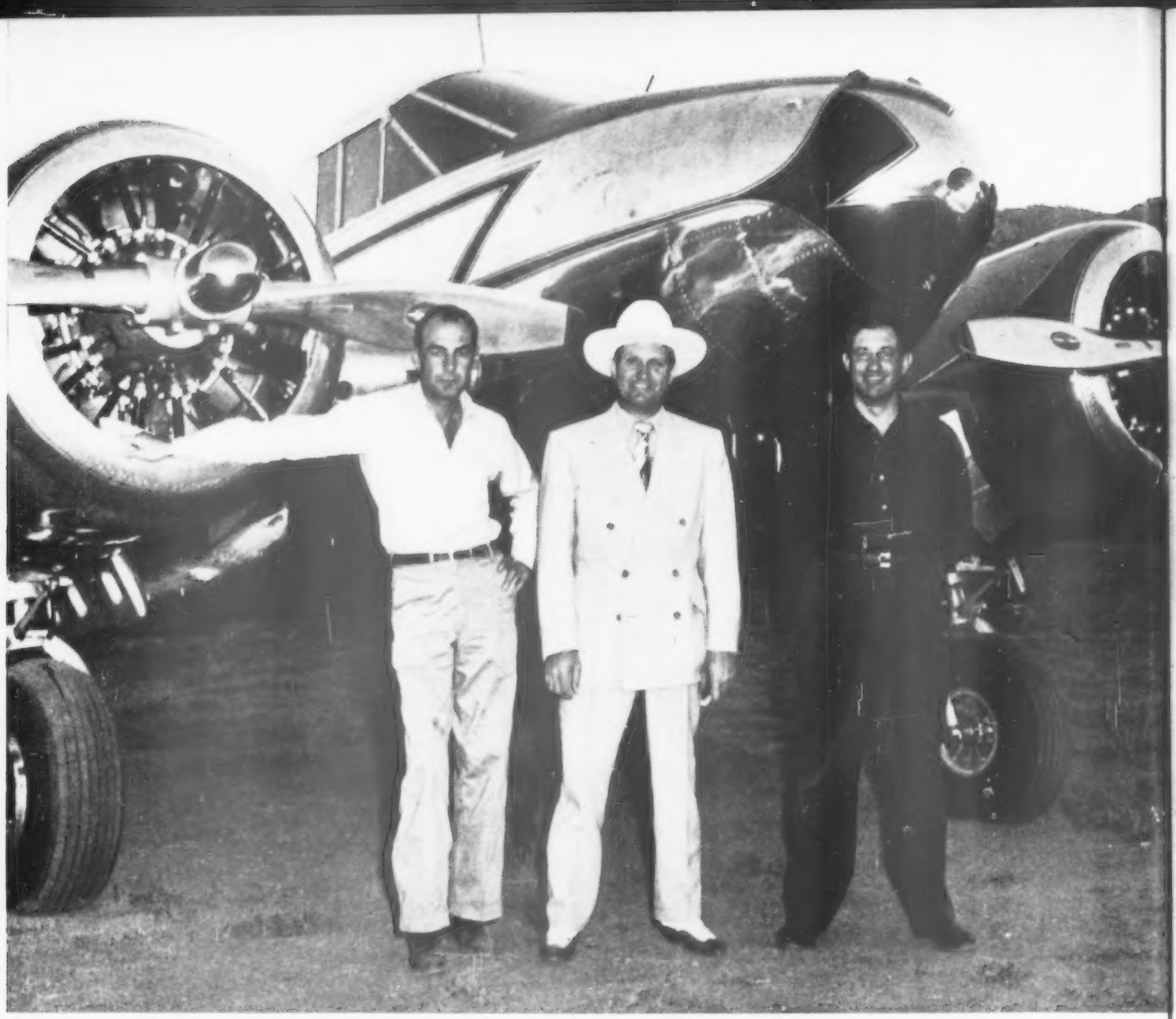
New Cessna 140A with 90-h.p. Continental engine cruises over 110 m.p.h., lands at 41 m.p.h. Top speed: 'over 125 m.p.h.'

On one landing I tramped on the brakes right after making contact with the runway. The Cessna slowed down and dug in but had no tendency to nose over.

The cabin interior offers improved passenger comfort and beauty. Airline type air vents at the upper left and right side of the windshield are standard equipment. The chocolate-colored automobile type panel is almost identical to the dash in the 170. Instruments are well arranged. Only engine instruments and altimeter, airspeed and compass are included as standard equipment. Space is provided for a primary instrument flight group. Prior to 1948, two toggle switches turned mags on and off. The key switch introduced last year has been retained in the 140A. The mixture control for economical cruise is provided with a safety catch in accordance with good engineering principles. Mixture cannot be leaned accidentally. A stall warning indicator is standard equipment.

The seats are foam rubber over springs and are upholstered with wool trimmed in leather. Upholstery comes in two color combinations to blend with outside color trim. Planes striped in red have a two-tone brown interior. The green paint jobs (*Continued on page* 58)

Sleek-looking Cessna can be converted easily to floatplane. Wing in 1949 version is all-metal. Price of 140A landplane is $3,495 with 85-h.p. engine and $3,695 with 90-h.p. Continental.



The 'Autry Airline' is a three-man, one-plane operation. Gene (center) takes his regular turn at the controls. Crew Chief Jimmy Clarke (left) has modified plane for special Autry needs, and Co-Pilot Herb Green (right) doubles in brass as Autry's personal business manager.

Cowboy pilot flies 65 per cent of the time at night, and he logs 50 to 75 hours of instrument time in the D-18S each year.

Twin-engined Beech gives airline reliability to Autry schedule. It saves Gene money despite its $60 to $75 hourly cost.

Gene Autry, BUSINESSMAN PILOT

Gene Autry has logged approximately 4,000 hours, carries commercial, instrument and ATR ratings.

A BUSINESS PILOT'S REPORT

Right on schedule, Gene's D-18S arrives in Chicago for CBS broadcast with the three "Pinafores," who sing on his show.

Gene's 'back in the saddle again' —this time in a Beechcraft D-18S.

By BOB ARENTZ

GENE AUTRY'S airplane has become as essential to the operation of his nationwide business interests as his horse *Champion,* his famous guitar, and the personality that has made him the world's top-ranking western movie star.

Gene owns and flies a twin-engined Beechcraft D-18S. An outsider might thoughtlessly attribute his ownership of N80395 to a sportsmanlike love of flying and the happenstance that he has money enough to afford his fancy. The facts are quite otherwise.

Without that airplane, Gene would feel like a cowboy afoot on the desert. It carries him to more than 120 personal appearance dates annually, makes much easier his six motion pictures per year, and allows him to find time for more than 60 active days performing in rodeos all the way from Boston and New York to California. It also helps him to take a much more direct hand in managing several ranches, a newspaper, radio stations in Phoenix, Tucson and Santa Monica, and other business affiliations which even include a partnership with Bill Marsh in an Arizona flying service.

Gene Autry is a top-notch pilot with an airline transport pilot's rating, and he probably makes as extensive use of an executive airplane for business travel as any man in the U.S.

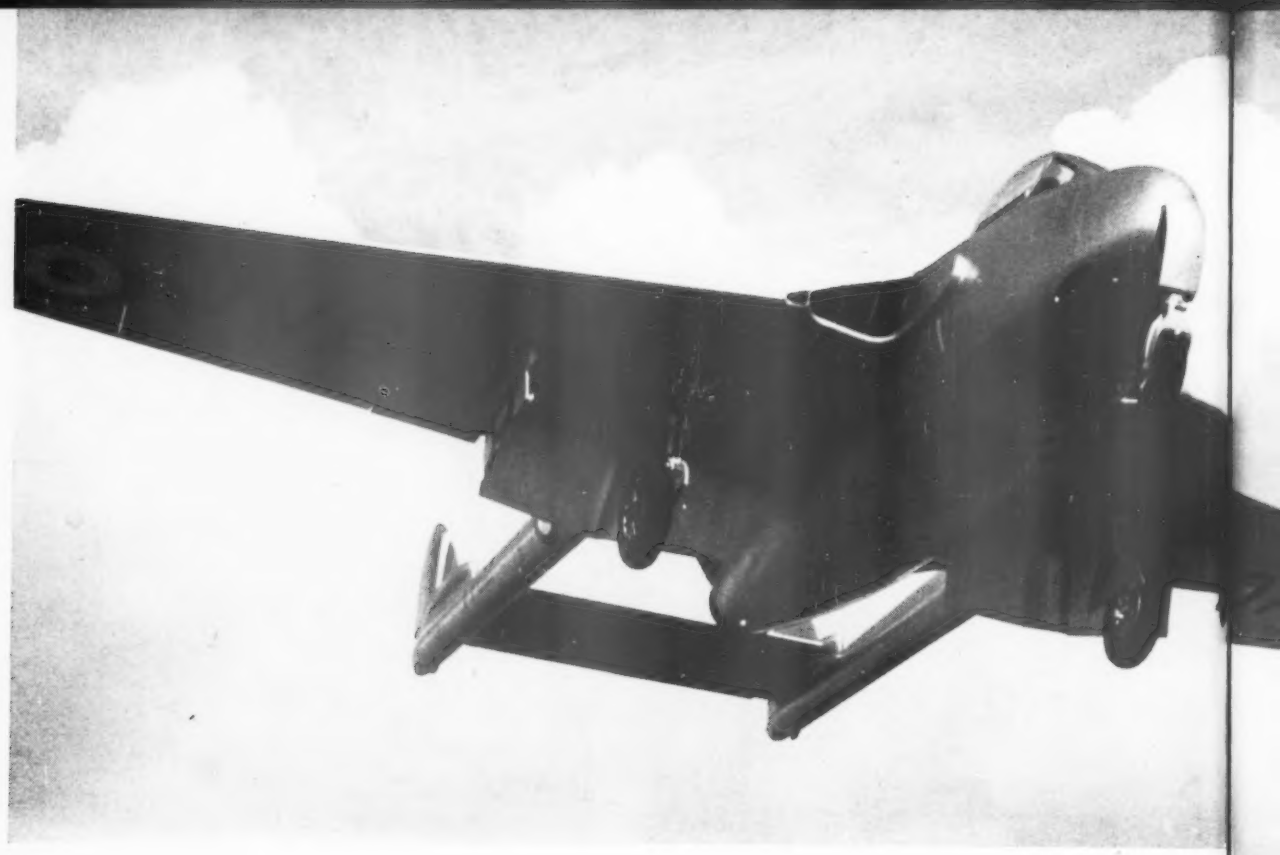
During Gene's appearance at the week-long Salt Lake "Days of '47" rodeo, managed by Harold Welch, I studied what real advantages the Beechcraft offered Gene to justify its operating cost of $60 to $75 an hour.

Well, he'd been on the radio the night before in Hollywood, had a recording date the morning of the Salt Lake show, and made his Utah opening with time to spare.

"Days of '47" terminated late at night, with Gene required in Hollywood early the next morning for a business conference, followed by a recording date, followed by a radio show. He also had his Melody Ranch Boys in Salt Lake, and his personal representative, Herb Green, all hankering to wake up in California sunshine.

Less than three hours after he waved goodbye to his rodeo friends he was driving home with Ina Autry who met the plane at Lockheed Air Terminal, Burbank. The next night he flew to San Francisco to open another rodeo engagement.

A couple of weeks before, he ended a night engagement at Mandan, N. D., with a court (*Continued on page* 62)



BRITAIN'S
New Jet Warplanes

Part of Farnborough display during 10th exhibit of Society of British Aircraft Constructors shows Armstrong-Whitworth Apollo powered by Mamba turbo-props in left foreground; four-jet de Havilland Comet at right.

DeHAVILLAND VENOM (DH-112)

A high-altitude interceptor fighter, the four-gun Venom (left) was developed from the Vampire, now operational with RAF. Top speed, service ceiling and rate of climb show "marked increase" as compared with Vampire. Wingtip tanks (below) can be jettisoned. Powerplant is DeHavilland Ghost turbojet (5,000-pound static thrust). Note slight sweepback in thin wing.

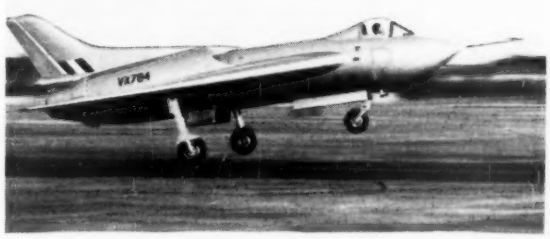
New British planes show speed maneuverability, sound design.

PERHAPS THE MOST amazing collection of aircraft ever gathered together in a single place in history was on display early in September at the 10th show of the Society of British Aircraft Constructors (SBAC) at Farnborough Airfield, Hants, England. An estimated quarter million visitors, including many American aeronautical engineers and military officers, watched and studied 59 aircraft on exhibit, of which 24 were powered by turbo-prop or turbojet engines.

For British transport aircraft, the show was an historic milestone. For military planes, it seemed to indicate that the British have at least kept pace with American planes, and that their jet and turbo-prop engines—those made public at least—are in advance of our own. On the other hand, a dispassionate observer might conclude that British engines were much farther in advance of their airframes than is true in the United States—a doubtful advantage considering the present state of the airframe art.

Despite the piston-engined types on display, it was a jet show. Every one of the piston-engined civil airplanes there had been seen before and only two of the piston-engined military types were new—and these were both developments of earlier types.

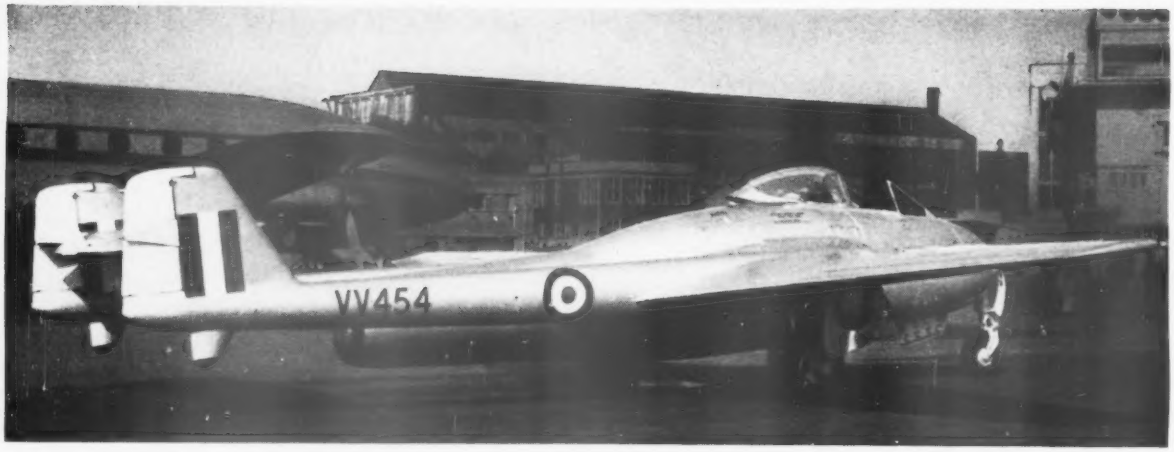
In advanced military fighters, the British showed themselves in somewhat the (*Text continued on page 67*)



AVRO TYPE 707

Delta-winged fighter resembling U. S. Convair XF-92 was experimental craft to test configuration. Plane later crashed but larger models are expected. The 707 had span of 33 feet, was powered with 3,500-pound S.T. Derwent jet.

TURN PAGE FOR MORE PHOTOGRAPHS →

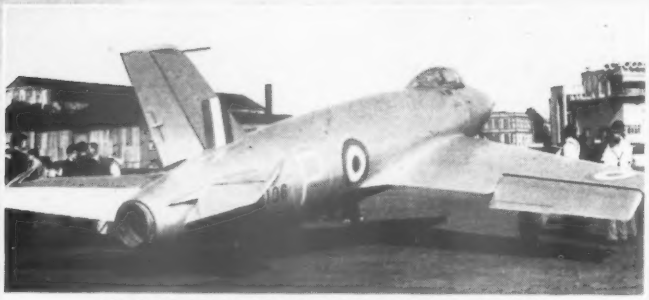


BRITAIN'S NEW JET WARPLANES

Continued

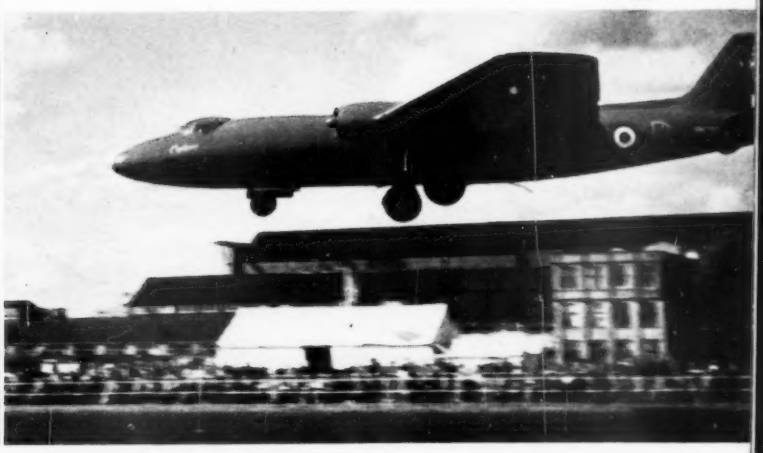
DeHAVILLAND VAMPIRE

D.H. 100 version of famed Vampire has afterburner installed (note elongated tail pipe) which gives 50 per cent more power. Tail has "bumpers" to prevent scraping.



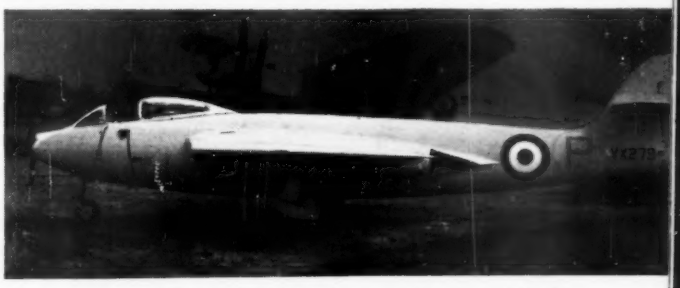
VICKERS-ARMSTRONG SUPERMARINE TYPE 510

Swept-wing fighter has sea level speed over 670 m.p.h., which approaches official world record. Type 510 has span of 38 ft. 8½ in., wing area of 273 square feet, and is powered with late 5,000-lb.-thrust (plus) Nene jet.

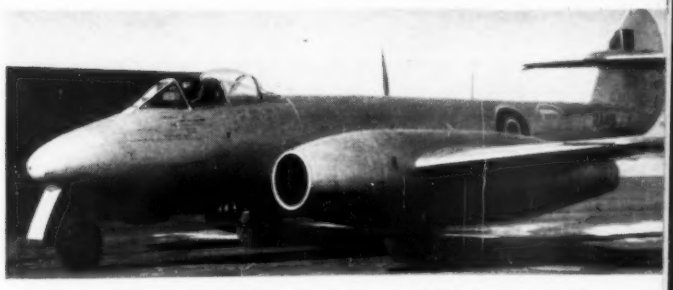


ENGLISH ELECTRIC CANBERRA B.1

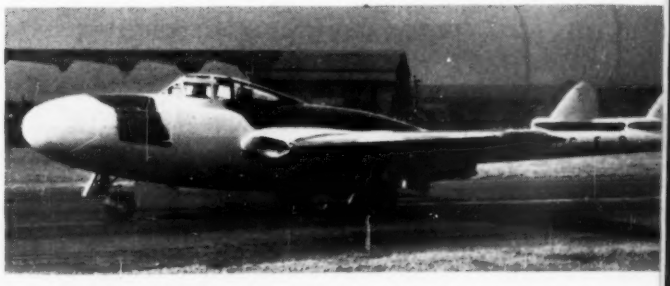
First British jet bomber, the Canberra is powered by two of the new Avon axial-flow turbo-jets which generate a reported 7,500 pounds of static thrust each. Canberra is 64 feet long, has span of 65 feet. Tricycle gear has coupled nosewheels. Flight demonstrations showed Canberra has amazing maneuverability and speed range for a large plane.



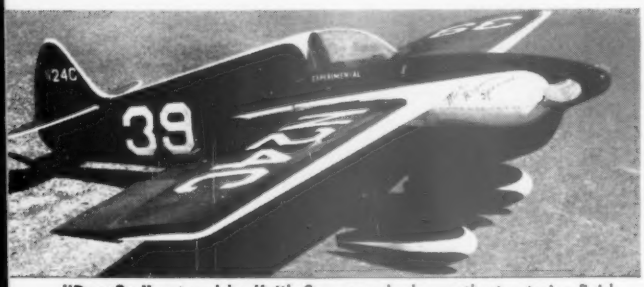
HAWKER P. 1052 Swept-wing fighter (see cover) is powered by Nene, has bifurcated jet pipes for greater fuel capacity.



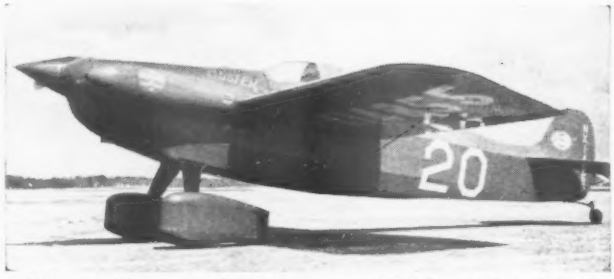
GLOSTER AVON METEOR Twin-jet plane is most powerful fighter in world. Two Avon jets give reported 15,000 lbs. of thrust.



DeHAVILLAND D.H. 113 Night fighter conversion of Vampire is two-seater, carries heavy load of radar. Goblin jet unchanged.

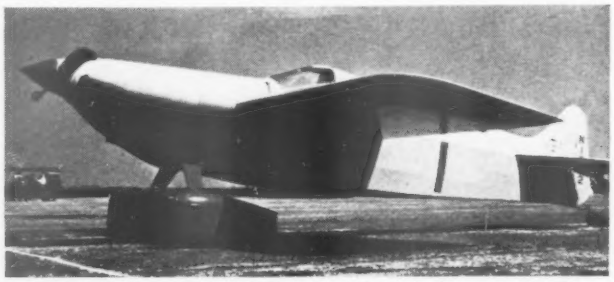


"Deerfly," entered by Keith Sorenson, had smoothest exterior finish of any plane in 1949 Goodyear. It placed second with 176.726 m.p.h.



Wittman "Buster," piloted by 108-pound Bill Brennand, took first in 1949 Goodyear with 177.340 m.p.h. It won $7,320 prize money.

Lawrence Tech pusher cost $1,600. It flew 128 m.p.h. at 70 per cent power in 1949 races, but its design speed is approximately 180 m.p.h.



"Bonzo," flown by S. J. Wittman, took third place, won $2,520. Wittman says S-shaped wooden prop gives two-pitch performance.

America's most colorful race planes are midgets built in backyard shops.

Homemade Racers

Goodyear entries in 1949 were faster than previous year. Top speed in qualifying races shot up from 165 in 1947 to 183 m.p.h.

Modified "Cosmic Wind" had steel-tube fabric-covered fuselage, cylinder-head fairing, raised wing, sleeker canopy. It came in fifth.

Unmodified "Cosmic Wind," a few tenths of a mile faster than modified version (top) was fourth in races with 175.974 m.p.h. average.

By GLORIA HEATH

THE BACKYARD INVENTORS are back at work. In make-shift workshops all over the country, hundreds of plane-builders are tinkering and puttering these days. They have a gleam in their eyes. Home-built planes are coming into their own.

Most attention is centered on the two big midget racing events: the Goodyear Trophy Race at the National Air Races and the Continental Trophy Race at the Miami Air Maneuvers.

All the home-built planes don't enter these events. But behind the list of 20 to 30 entries are the hundreds of amateur plane designers who work in their spare-time to create midget aircraft that might possibly meet the high standards of these races.

It's not an easy job to build the kind of small racing planes that have recently come to the fore in U.S. amateur competition. They have less power than the family automobile, weigh only about 500 pounds empty, and zip through the skies at a good 160-plus m.p.h. Too, race regulations are stiff and CAA red tape abounds.

But the future of the backyard plane in racing competition looks bright.

In line with new trends in backyard aircraft building, CAA may ease certification procedures for "restricted-purpose" planes under Part 08 of the Civil Air Regulations. If adopted, these new rules would slash red tape but would not constitute a basic change in CAA's policy on experimental or home-built craft. For years, such planes as the Pitt's and Heath's have been granted CAA certification *experimentally,* after passing an airworthiness inspection. Of course, they are operated under strict limitations (can not, for example, be used for transportation for hire.)

Despite the problems involved, more Americans than ever before are building their own aerial flivvers. At every air race, the would-be constructors can be seen tapping and thumping on wings and fuselages—and, as often as not, turning up the following year with a craft which is "just a little different" from anything tried before.

In the past three years, technical progress has been marked. Speeds in the Goodyear Trophy Race qualifications shot up from 165 m.p.h. in 1947 to 183 m.p.h. in the 1949 races. Improvements have stemmed from the backyard planes. S. J. Wittman introduced the spring-metal landing gear used by Cessna. And other top designers have turned to the midgets for extra- (*Continued on page* 48)

RAISING CASH FOR FLYING CLUBS

By C. B. COLBY

Spend less and fly more! It's possible, if you will follow these suggestions.

IN THESE DAYS of inflated currency, when a good five-cent cigar costs 25 cents, everybody screams for low prices but nobody seems to do much about getting them. Pilots say they can't afford to fly as much as they'd like; and operators reply that they're losing money at present flight rates.

Sometimes pilots band together in flying clubs and obtain a substantial reduction in the per-hour cost. Even then, the rates don't nosedive. The club still has to operate its planes and any way you spell it that costs money.

Yet some clubs are selling time for less than it actually costs to run their aircraft!

They don't do it by sleight-of-hand. They do it by using novel money-raising methods that fill the club's treasury without draining the club members' pocketbooks.

Almost all clubs resort to the standard cash-raising schemes such as dances and raffles of free rides. But other clubs try unusual methods that keep the treasury well-filled and the club's hourly rates to a minimum.

One eastern club, for example, decided to promote airport courtesy and, at the same time, pad the club kitty. A seven-day period was set aside as "Thank-You Week"—and anyone who neglected to say "thank you" was fined 10 cents.

That club immediately became the most courteous organization on the east coast. Grease monkeys yelped "thank you" for monkey-wrenches, matches, empty coke bottles—even hot foots.

Pilots thanked each other all over the place and visitors went away muttering in their beards. Fines were levied on the spot. The club harvested a bucketful of dimes and the "thank you" habit stuck.

Books are an unexpected source of steady revenue. Almost every club member has several books on aviation. All members of one club brought their aviation book collection to the club room to form a lending library. The members ran it for the club and took turns being librarian, checking books in and out at a nickel a day. It gave all the members a chance to use all the books at much less cost than buying them individually—and a steady dribble of nickels and dimes and quarters flowed into the kitty.

Another book idea that worked for one club was for a book-a-meeting-raffle. A donation of aviation books was received from a magazine that had reviewed them, and a raffle was held at each meeting—to sell the books to the members. Each book was put up in turn, one each meeting, and 10 cent chances were sold to the members as they arrived. A drawing was held at the close of the meeting, and one member got the book for a dime while the club treasury got the rest. Of course this system would pay off only for a large club with a big membership; but this club, one of the largest in the country, raised nearly $50, and eventually most of the club members got a book.

One club raised cash by exploiting youngsters' desire to be "pilots." Here's how they earned over $100 and a lot of free publicity and local good will:

At the airport where the club operated, an ex-GI had abandoned a surplus fighter. The owner gave the club permission to use it for the project. The club then advertised that any youngster could have his picture taken in full combat regalia in his "own" fighter plane for 50 cents. The airport was mobbed.

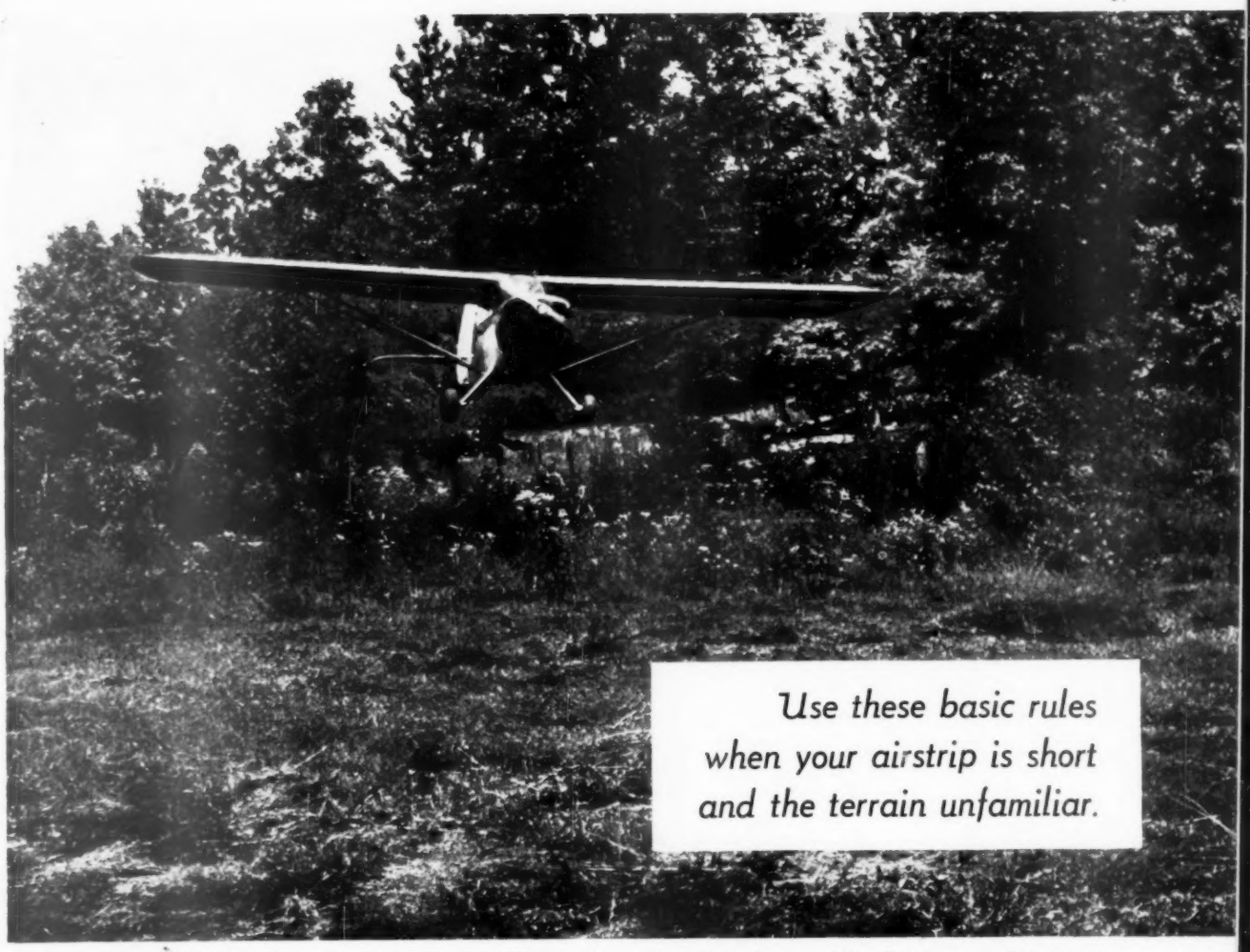
One of the club members with a 35-mm. camera was on hand to take the pictures while another member handy with a brush stood by to make the fighter the youngsters "very own"—for the picture at least. As each embryo pilot was put into the cockpit and fitted with helmet and goggles the chap with the lettering brush printed "JOHN JONES, Pilot," just below the cockpit edge and above an impressive collection of "rising suns" and swastikas. The picture was snapped, the "JOHN JONES" wiped off with a turpentine rag, and the next youngster took his place for the picture.

On one weekend over 200 "pilots" had been photographed and everyone was happy but the lettering expert with a lame arm. Prints were available a few days later, or enlargements if they wanted to pay extra, and on the back of each was stamped a plug for the club, its membership, instruction and flight rates and an invitation to attend club meetings. Several new members, friends or parents of the youngsters, signed up and a lot of good publicity resulted from the stunt.

Some clubs have raised money by an annual paper drive. The members check with (*Continued on page 77*)

A DOZEN HINTS FOR RAISING MONEY

1. **Sponsor dances or amateur plays.**
2. **Run a bingo party.**
3. **Operate an aviation lending library.**
4. **Start a snack bar or refreshment stand.**
5. **Sponsor a rummage sale.**
6. **Conduct a wastepaper drive.**
7. **Hold raffles, install punch boards, pinball machines, automatic coin games.**
8. **Plan club quiz programs.**
9. **Install vending machines.**
10. **Run a small pilot's-supply store.**
11. **Install a juke box.**
12. **Assess fines for rule infractions.**



Power approach is required in most short-field operations. Use enough power to hold the plane nose-high, allowing a controlled descent.

Short-Field Landings

By ROBERT C. SELLERS

FLYING farmers and other pilots operating lightplanes in rural areas face the problem of operating in and out of fields other than conventional airports. This can be extremely hazardous unless the pilot uses a few basic techniques developed by men with years of experience in this type of operation.

The first problem that confronts the pilot who intends to use open fields for his landing strip is to make a "high drag," that is, to view the field from about 600 to 800 feet and determine the following:

- Exact strip upon which he intends to land.
- Existence of high obstructions to landing glide angle and take-off path.
- Wind direction.
- Direction of pattern to be flown.
- Best area for forced landings when taking off from strip.

Once he has this information, the pilot reduces altitude to about 50 feet above the highest obstruction in his strip area and flies down the strip (in normal landing direction) off to one side, preferably downwind. He completes his "low drag" during which he determines the following:

- Approximate height of obstructions over which he has to land and take off.
- The three points of usable runway space:
  a) Point of touchdown.
  b) Point at which he will go around if not down.
  c) Point at which usable landing area is exhausted.
- Condition of the terrain (gopher holes? stumps? large rocks? rain gulleys? mud? sand?)

With knowledge of all the above factors, the pilot can then concentrate upon his landing. Obviously, the routine power-off approach will not be advisable in most short-field work, particularly in cases where a fence or tree prevents touchdown in the first third of the strip. Therefore, a power approach is required. Enough power should be used to hold the aircraft in a nose high attitude, allowing a controlled descent. The (*Continued on page* 54)

REPORT FROM
WASHINGTON

U. S. aircraft factories may be vulnerable to attack by enemy air fleets.

Will the Plane Plants Be Moved?

By RICHARD SAUNDERS
Washington Editor of FLYING

AS SOME of the Pentagon planners see it, the aircraft industry is like a beach doll in a French style bathing suit—too exposed in some places.

What to do about it? Again the worried strategists think in terms of the resort policeman spotting an overdisplay of pulchritude. If it can't be covered it must be removed.

They would like to walk up to one of these exposed plants, take it politely by the arm, and escort it to a location where it would be less tempting to possible enemy raiders. But in a free country, the Government cannot dictate in this manner. It can't impose a relocation pattern on industry—not even for its own good. Like any other buyer, however, it has the right to stipulate the conditions under which it chooses to do business.

In the case of the aircraft industry, the Government is in a position to exert a profound influence because it is by far the leading customer. It never has tried to throw its weight around very much, however, and there is no certain indication that it proposes to do so now. Both Air Force and Navy spokesmen emphatically deny that any plans are being cooked up to shift military plane procurement away from vulnerable spots.

Relocate or camouflage? Beneath this "country hillside" is Douglas hangar at Santa Monica, disguised in World War II.

Just the same, there already are a few instances where official pressure seems to have played at least some part in bringing about a shift in production. Some time ago Chance Vought, which turns out carrier planes for the Navy, closed down its operations at Bridgeport, Conn., and moved to Dallas, Tex. During the B-36 hearings before the House Armed Services Committee, Air Force officials made it known that the new Boeing B-47 jet bomber will be manufactured in Wichita, Kan., instead of Seattle. The reason: Seattle is not considered a good location because of its "strategic vulnerability."

In the face of this evidence, the possibility of further Government pressure for relocation cannot be dismissed. It is no secret that the Government would like to see its idle plants in Omaha, Tulsa, and Atlanta go back into production. The Omaha and Atlanta plants turned out B-29's during the war. Douglas A-20's were manufactured at Tulsa.

Policy Is Inconsistent

The shifts could probably be made with a minimum of inconvenience to the industry, but the workers are not too happy about it and the localities from which activities are being taken are even more disturbed.

In fact, there has been some squawking about the inconsistency of the Administration in first closing down production for the Government in a community and then going in under the program for helping distressed areas and attempting to place other contracts. This was what happened in Bridgeport.

For its part, the industry appreciates the solicitude being shown for its safety. But as some of its spokesmen have observed: if the Government really wants to keep aircraft plants in a vigorous condition a better way to do it would be to step up its orders. Actually, production could be tripled in the plants now being operated by the industry without an increase in floor space although additional machinery would be required.

What appears to be the chief gripe of the industry is the way it is being kept in the dark about relocation plans. It does not mind a certain amount of relocation if that is essential to national security. But it does feel a little annoyed when no two agencies seem to agree on what constitutes a safe or exposed location. To say the least, official thinking on the subject is extremely fuzzy.

Presumably the Air Force feels that coastal locations are vulnerable. In taking this position it contradicts itself. The AF has always been inclined to minimize naval action and to stress the importance of the long range bomber. Yet naval action is the only power that makes coastal sections more vulnerable than the interior. The Navy League was not slow in pouncing on Air Force inconsistency in this matter and pointing out that it was an oblique recognition of the function of sea power.

All U.S. Is Vulnerable

A somewhat different view of the situation is taken by the National Security Resources Board. This is the agency responsible for civil defense planning and for mobilizing the nation's resources for emergencies. As NSRB sees the picture, one section of the nation is about as safe as another since every part of the country is within the range of enemy bombers flying (*Continued on page* 78)

New Air Force trainer, the North American T-28 has cockpit arrangement tailored on jet types. Its 800-h.p. Wright engine gives it top speed of 288 m.p.h. and service ceiling of 29,800 feet. Cruise is 166 m.p.h., stall 72 m.p.h. Air Force has ordered 268 of the planes.

HAVE YOU SEEN?

Clipped-wing Piper P-2 aerobatic plane (85-h.p. Continental fuel injection engine) climbs 1,600 f.p.m. Top speed: 125 m.p.h. Span: 25 feet.

First flight photo of Lockheed F-90 penetration fighter shows rakish 35° wing sweepback. Giant single-seater's gross take-off weight is about 26,000 pounds. Power plants: two J-34 jets with afterburners. Span: about 40 feet. Length: about 55 feet. Performance: classified.

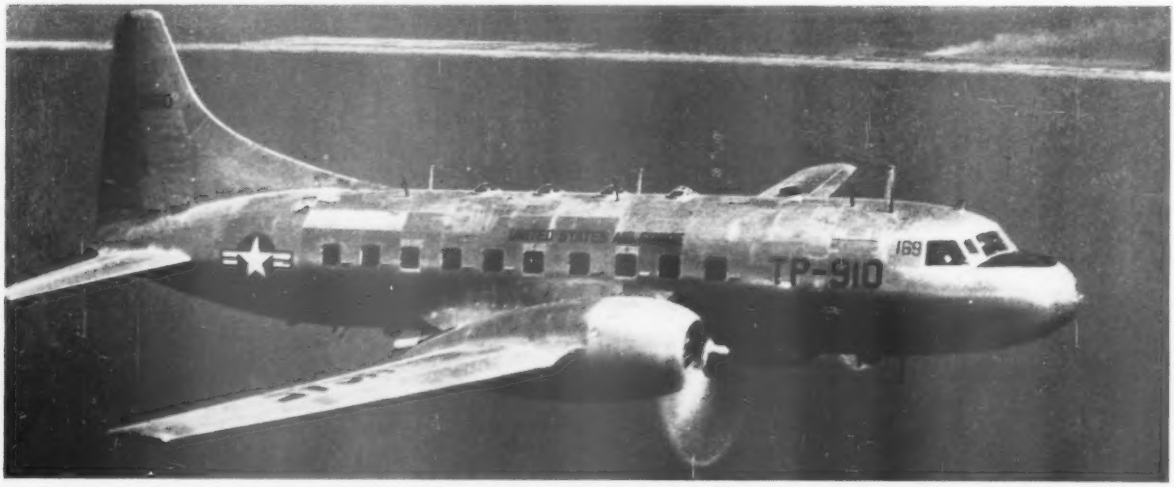
HAVE YOU SEEN? *continued*

Bomb-shaped DDT tank holds 25 gallons, takes five minutes to install in Air Force plane. DDT is sprayed through holes in props.

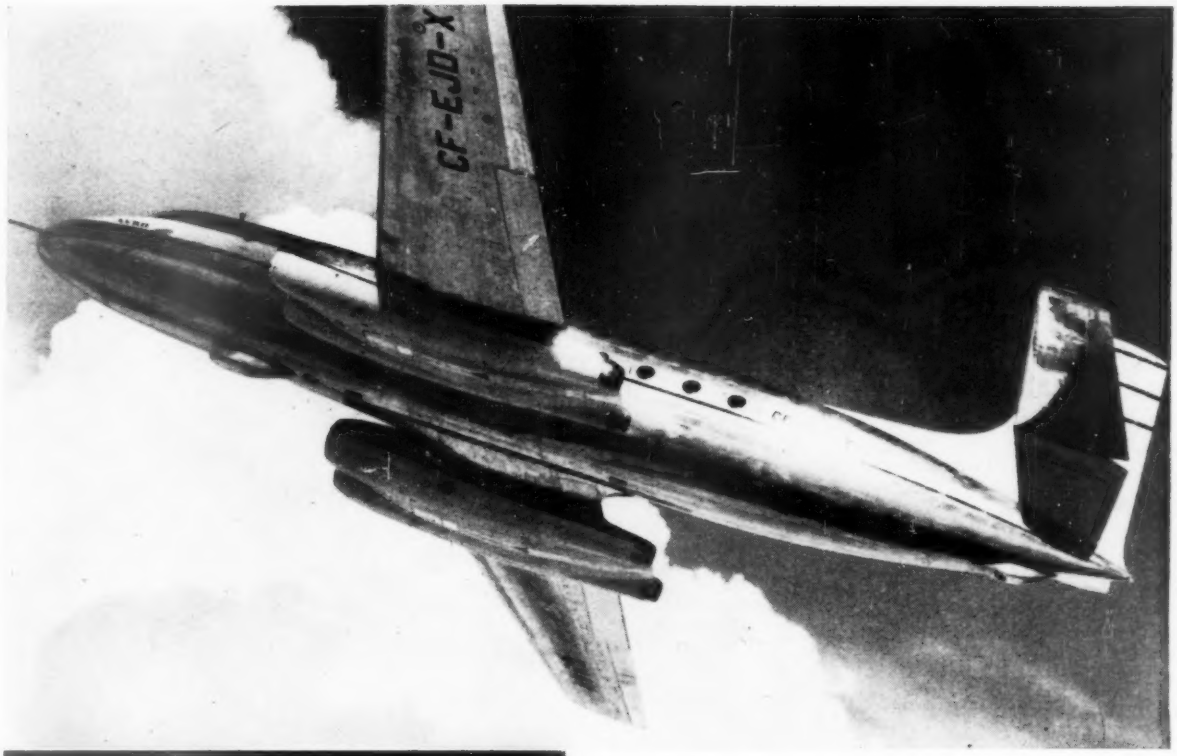
In mothballs, this B-29 is one of hundreds stored on desert at Tucson, Ariz. All wheels of fabric-encased bomber are off ground.

French "Bagimer" was once a Piper Cub. Plane's modifications include new undercarriage, cockpit cover, door and tail assembly.

Taylorcraft's 1950 "Sportsman" sells for $2950 f.a.f. It cruises at 110 m.p.h. on an 85-h.p. Continental engine, has a 300-mile range. Two other Taylorcraft models now in production are the "Special Deluxe" priced at $2195 f.a.f. and the "Custom Deluxe" at $2585 f.a.f.



A flying classroom, the Air Force's T-29 navigational trainer has four astrodomes on top of fuselage. Large bulge under forward fuselage is radome. Plane is military training version of the 40 passenger, 300-m.p.h. Convair-Liner. T-29's gross weight is 40,500 pounds.

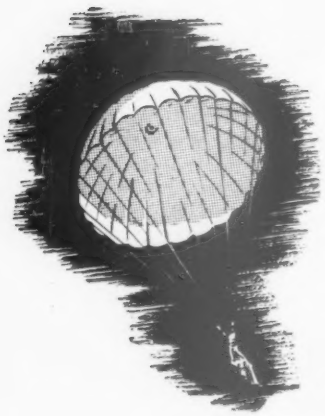


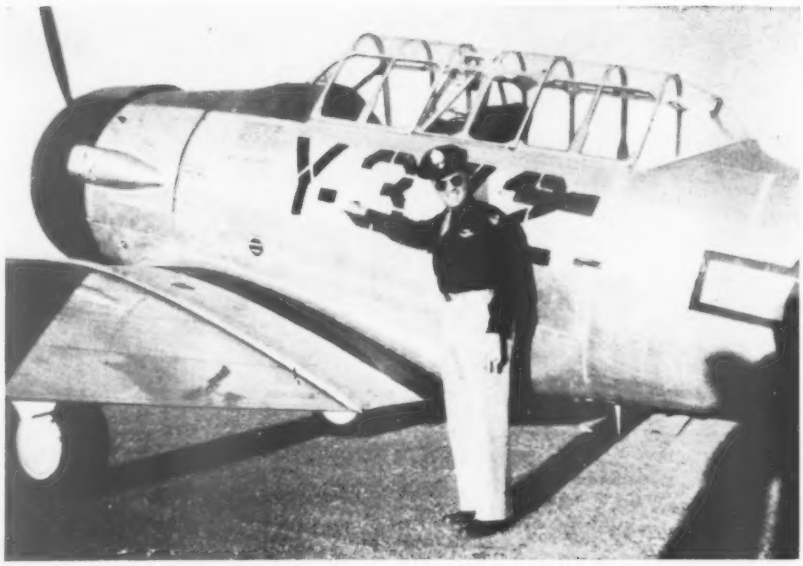
Avro Jetliner, Canada's 50-passenger four-jet civil transport, is expected to have cruising speed of 430 m.p.h. at 30,000 feet.

Scale model of new French flying boat, Sud-Est SU-1200 is one-third size of projected craft. Photo was taken at Paris airport.

Soviet plane which crash-landed in American Zone, Vienna, with political refugees appears to be a TU-2 medium bomber and attack monoplane designed by A. N. Tupolev. TU-2 has a top speed of 345 m.p.h., a reported range of 1550 miles. Bomber was returned to Soviets.

I Learned About Flying From That! NO. 121





The author (right) had 2,000 hours of flight time when he stumbled into instrument conditions while on contact clearance and was forced to bail out.

After bailing-out at night, the author was chased to earth by his own airplane!

By MALCOLM SINCLAIR

AS I SWUNG silently down through the blackness, the ground slowly became visible as a dark, hazy mass below me. For the first time I became conscious of the oscillation—and noticed I was descending more rapidly than I realized.

Before I knew it, I hit the ground. As I took the shock with my arms and knees, I caught a glimpse of my parachute trailing out ahead. The impact threw me on my face.

I got up slowly, stowed the ripcord away in a pocket, donned my hat (which I found in my left hand) and began pulling the parachute toward me. I tucked the silken bundle under one arm and tramped off through the swampy meadow in which I'd landed.

What had happened? How did a 2,000-hour pilot get into a situation like that? I didn't want to answer that question, even to myself. I had blundered my way into that emergency bail-out by committing mistakes that I wouldn't excuse in the most inept student pilot.

That afternoon, I had taken off in an AT-6 on a routine flight between two airfields in the Middle West. The weather had cleared after two days and I was eager to get started. That, in part, accounts for the fact that I paid scant attention to the marginal weather in the vicinity of my destination. It was only a two-hour hop and I was scheduled to arrive at sundown. Weather forecasts indicated rising ceilings and improving visibility throughout the entire region. I took off on a contact clearance.

After 1 hr. 15 min. of flying, I ran into the hazy, cloudy pall that had been forecast for the area. I flew underneath the 1,500-foot ceiling after getting a radio weather report of favorable conditions ahead.

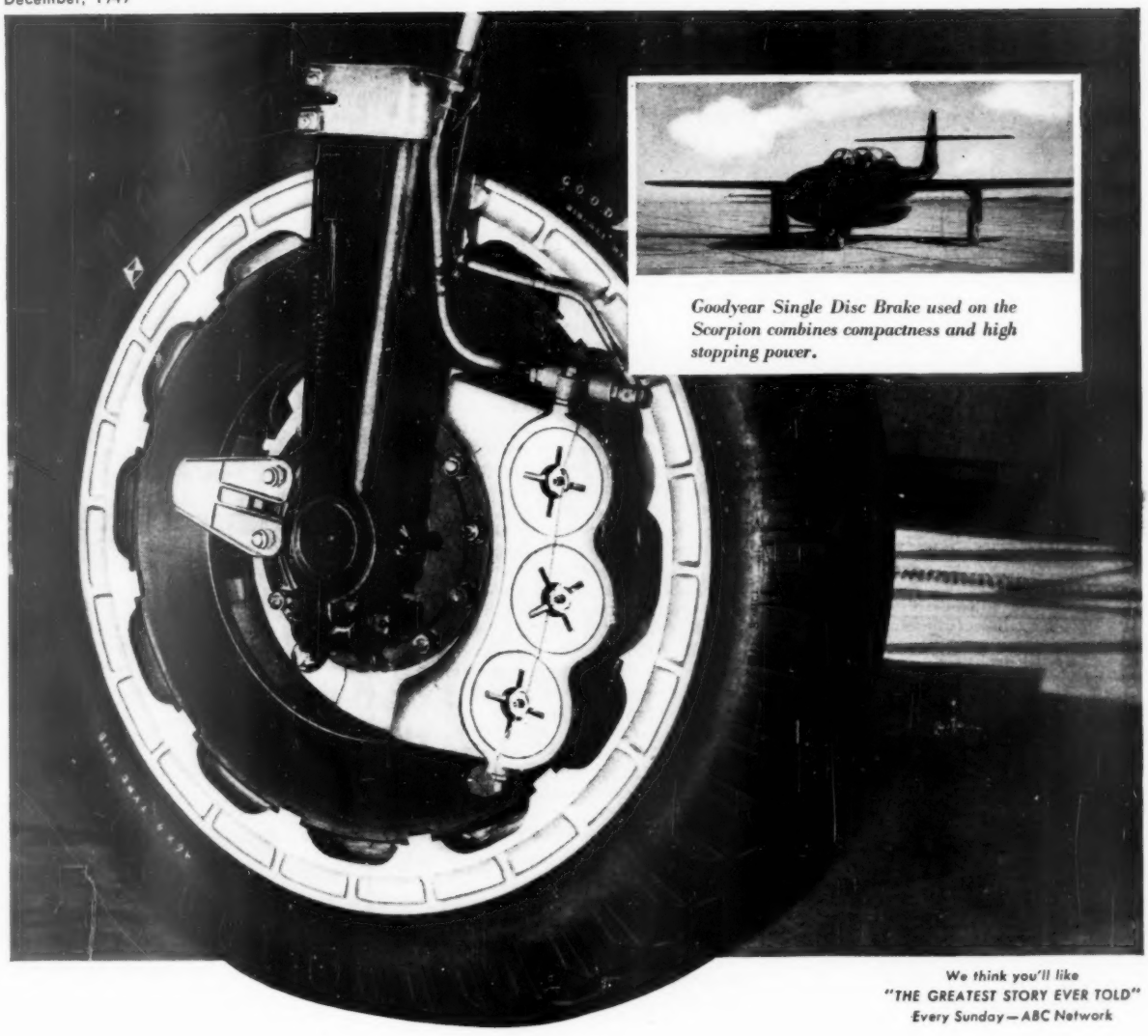
At sundown, I was still 30 minutes from my destination. Ceiling and visibility had lowered to contact minimums. And conditions were getting worse. I decided to turn back, heading for a field midway on my route. I kept under the base of the clouds but fog was forming and the area was closing in completely. In a few minutes I couldn't see the ground—or lights on the ground—from an altitude of 500 feet. With a 1 hr. 30 min. gas supply left, I climbed up through the overcast, feeling somewhat alarmed.

At 6,000 feet, I pulled out of the dense cloud layer and found myself between two overcasts, one just below and the other about 3,000 feet above. Underneath, the layer was unbroken. I tuned on the beam and followed the leg into the station—the only one within my gas range.

Over the field I attempted to contact the control below, but only then discovered my transmitter wasn't functioning! No excuses. I had brought it all on myself and I knew it.

If I made an instrument letdown, I'd be risking a collision with other planes working the same beam leg. And even if I did let down successfully, the field would probably be closed anyway.

But, since this was the only (*Continued on page* 56)



Goodyear Single Disc Brake used on the Scorpion combines compactness and high stopping power.

We think you'll like
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Every Sunday — ABC Network

Solution
to tire problem XF-89

Powerful, heavy jet fighters like the Northrop XF-89 Scorpion require extra-tough tires with sufficient air-cushioning capacity to safely sustain the landing impact — *yet they must be fully retractable within the thin wings.* These needs are completely met by use of Goodyear 46x9 Rib All-Weather Tread tires. This extra-high-pressure casing has super-thick tread and sidewalls to absorb impact shocks. And it is narrow enough in cross section so that tire, wheel and its powerful Goodyear Single Disc Brake all recess snugly within the wing. For complete information on these time-proved products, write: Goodyear, Aviation Products Division, Akron 16, Ohio or Los Angeles 54, California.

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AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full time staff is devoted to helping the individual pilot. Its aim is: "To make flying more useful, less expensive, safer and more fun."

Headquarters are: 15th and New York Aves., Washington 5, D. C. Members also receive a special AOPA edition of FLYING, newsletters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING MAGAZINE.

LABORATORY TESTS

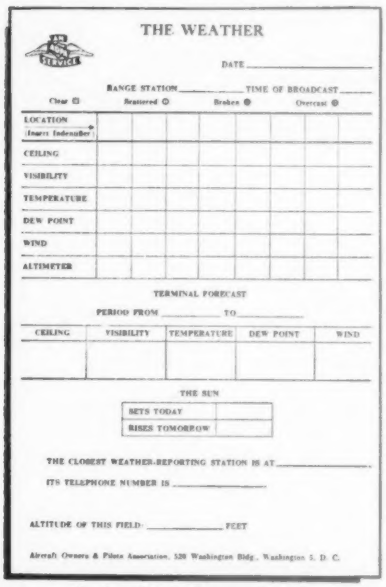
Newest AOPA project now under consideration hopes to make use of recognized testing laboratories around the country to give AOPA members authentic reports on various types of equipment and supplies.

AOPA hopes to be able to budget funds for projects like this, enabling the organization to give its members unbiased reports on products of great interest.

WEATHER PADS

Airport operators who are AOPA members have voiced enthusiastic acceptance of the new weather-recording pads recently supplied to those requesting them.

The response has been so good it has been necessary to reprint the pads. Because of the limited supply, they are available only to airport operators who also are AOPA members.



THE WEATHER

DATE _____

RANGE STATION _____ TIME OF BROADCAST _____

Clear ⊡ Scattered ⊙ Broken ● Overcast ⊗

LOCATION (Insert Indicator)								
CEILING								
VISIBILITY								
TEMPERATURE								
DEW POINT								
WIND								
ALTIMETER								

TERMINAL FORECAST

PERIOD FROM _____ TO _____

CEILING	VISIBILITY	TEMPERATURE	DEW POINT	WIND

THE SUN

SETS TODAY	
RISES TOMORROW	

THE CLOSEST WEATHER-REPORTING STATION IS AT _____

ITS TELEPHONE NUMBER IS _____

ALTITUDE OF THIS FIELD: _____ FEET

Aircraft Owners & Pilots Association, 528 Washington Bldg., Washington 5, D. C.

The pads are particularly helpful to small airports not having weather-reporting facilities on the field. Operators now can listen to the regular radio-range weather broadcasts, copy all weather reports given at that time, and post the forms on the bulletin board for local pilots to see.

CONTROL TOWER

How much authority does a control-tower operator have?

AOPA members have asked this question several times recently, so we've got the official answer from CAA:

"The traffic controllers of CAA operate strictly within the bounds prescribed by the CAB in Part 60 of the Civil Air Regulations. This part declares that 'the pilot in command of the aircraft shall be directly responsible for its operation and shall have final authority as to operation of the aircraft.' It goes on to define an air traffic clearance as 'authorization by air traffic control, for the purpose of preventing collision between known aircraft, for an aircraft to proceed under specified traffic conditions within a control zone or control area.'

"Acting under this regulation, we always have instructed out controllers that they have authority to clear aircraft only with respect to traffic conditions, and that in providing weather information, they are simply furnishing assistance, but have no authority to prevent a plane from taking off because of weather."

THE BIRD PROBLEM

Birds are becoming an increasing problem around airports. At some of the larger fields, especially in England, they are trying a number of things, including the use of falcons—which are reported to work fine, but cost too much to train and maintain.

They're also experimenting with strings of firecrackers, set off at intervals by time fuses.

Jerome Lederer, head of the Flight Safety Foundation, had another idea:

"Collect the birds' eggs, hard-boil them, then put them back in the nests. The birds will soon get discouraged and wither away."

OMNI CHART

First experimental sectional chart to show omni and other VHF facilities has been issued by Coast & Geodetic Survey, with the first copies going to AOPA for distribution to members.

First members to receive the charts were those attending AOPA's annual roundup flight to Rehoboth Beach, Del., September 17-18 (full details on that flight appear in the current AOPA PILOT).

Other AOPA members have been mailed a copy of the experimental chart (which is based on the Washington sectional) as they request them. Copies are free, with the request that members will send national headquarters their written opinion of the chart's various new features.

FLASHERS AGAIN

Indications now are AOPA may be winning point in favor of light-flashers for personal planes. CAA engineers have long objected to proposal that "hot-shot" battery systems be used to flash lights on personal planes not having electrical systems.

Recent discussions, however, indicate CAA engineers have recognized fact that expensive light-flashing systems similar to those used on airlines simply can't be forced on private flyers.

OMNI BULLETIN

Another new item on omni is AOPA's Pilot Service Bulletin No. 13 entitled "Omnigation." Just off the press, the booklet tells in detail what omni is, what it means to private flying, and how the private flyer uses it. The most comprehensive publication of its kind yet produced on omni, the bulletin is complete with drawings, photographs and charts. The National Aeronautical Corporation, Ambler, Pa., manufacturers of Narco omni equipment for private flyers, has ordered 1,000 copies of "Omnigation" for distribution to buyers of Narco equipment.

The new publication is available free to AOPA members, upon request.

MAP SERVICE

AOPA's new subscription map service (available only to members) continues to expand. Present chart deliveries, including subscriptions and individual orders, are running at the rate of 73,000 per year.

VITAL STATISTICS

In case anyone's interested in the scope of AOPA's work, here are some figures that will help:

We're writing letters giving members information, advice and other help at a rate of more than 27,000 per year. That's over 100 letters per working day.

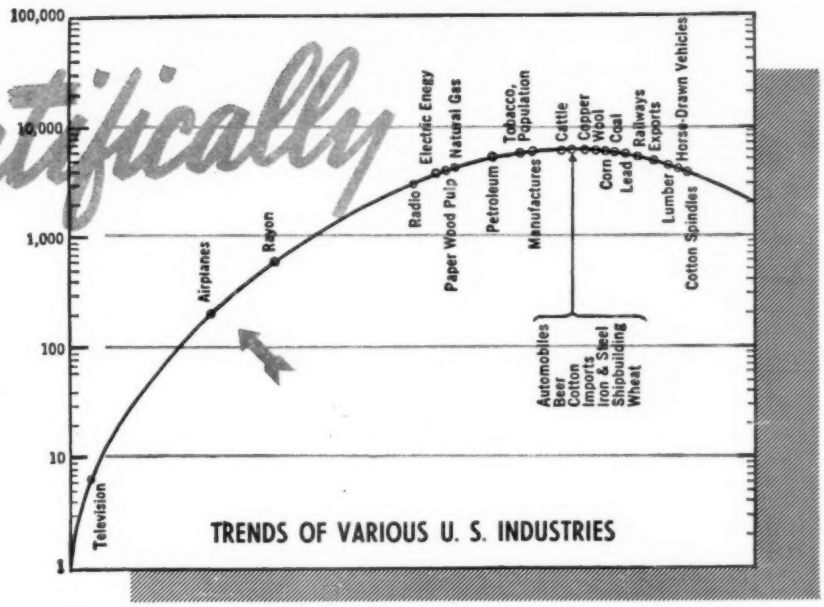
Airport ratings have been issued to 717 U.S. airports—about 10 percent of all U.S. airports.

Most interesting AOPA statistic: average age of an AOPA member is 36, and 37 per cent of the total membership is 40 years of age or older.

HOW TO CHOOSE A CAREER

Scientifically

In their famous book, "Cycles," Edward R. Dewey and Edwin F. Dakin (Henry Holt and Company, 1947) explain the "key to predicting what may come by examining what has been."



YOUR FUTURE IS TOO IMPORTANT TO MAKE A WRONG CHOICE. Study the chart above. Note the position of aviation. Is there any better way of getting into a new and uncrowded field than to choose a *growing industry?* Choose your career scientifically. Select an industry with a bright future. Then get the training to fit you for success on the job.

Spartan, *the University of Aviation,* trains men and women thoroughly for well-paid jobs in aviation. Spartan courses are GAA approved. They are geared to the industry. Here, you train on "live" aircraft, the same type of equipment you will work with after graduation. *You will not need more than Spartan training — you cannot afford to take less.*

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LOGGING TIME

WITH HY SHERIDAN

Captain, American Airlines

FIREPROOF FUEL

The CAA, the NACA, the AF and other groups of . . . ah . . . lettered men are hunting for fireproof fuel for airplanes and they are hunting like an old hound bitch I had in Wyoming when I was a boy, a hound who used to hunt bear. She never found a bear. As a matter of fact she didn't like bears—she just liked hunting. Like her, the research groups enjoy stringing out a project as long as possible. If they have a lot of projects on hand it makes them look important.

It must be for that reason that they have had so little success in finding a fireproof fuel, for the secret of a really fireproof combustible material is well known to the company that makes my pipe tobacco.

* * *

Aviation has made the world very small indeed. We had better hurry up and find out how to make people big.

* * *

ALL DONE AND BUTTONED UP

Beauty is forsaking the world at a breathless pace. Another beautiful thing is now no more, the old uniform of the able bodied seaman which so delighted the girls in emphasizing where he was the most able.

It is a sad thing to note, surely, that the high command has seen fit to give the Navy boys a new uniform, a uniform, they announced, of functional design. Shiver my bilge, sir, but it has pockets—and zippers.

Sadie the Stewardess says that now those 13 buttons are gone, the Navy lads are not half so fastenating.

* * *

Sadie says that the women are having a regular epidermis of exposure with their plunging neck lines. She says that the more neck the girls show the more the men want to.

* * *

AIN'T IT PWITTY?

The New Yorker recently noted the following message which was written by the pilot and passed along from hand to hand on an airliner landing at La Guardia Field:

A perfect day for our delight.
At half past eleven we shall alight.

This sort of thing is getting to be about as current as a red-head. It would seem from editorials in the *New York Times* and *The Saturday Evening Post* that many of the airline pilots are filled with the juice of creative genius and are prone to send back to their passengers literary ulcerations which are somewhat on the cute side, giving the impression (an editor put it) of Herbert Hoover doing a toe dance. Are these men to be allowed to outdo your own master nut, your reporter?

Upon this challenge your chumpion has lept to the breeches, to do or die for dear old FLYING.

I'm a cutie
Hot patootie
In the itty cocky pitty;
I say, okey, okey-dokey,
And you know that it's a jokey.
Don't be frightened, don't be leaping:
I'm a birdie—hear my cheeping.
I'm so tunning
With my funning
In my itty cocky pitty.

* * *

ADVICE FOR AN ENGINEER

The applicant for a flight engineer's job had just begun on his examination paper. One of the early questions was: What is a reciprocating engine? To this he answered: It is the kind of engine where if you do the best you can by it, it reciprocates.

* * *

Sadie says that the reason the older generation was sharper is that the kids got stropped when they needed it.

* * *

THEM BOILERS AGAIN

The bombers and the fighters are really getting up there these days, and it poses some problems for the pilots. The human blood boils at 63,000 feet, so the flight surgeons solemnly state.

But it boils lower down than that in the Navy. And so Congress has been trying to find out what's cooking. (Classified information: It's the taxpayer.)

* * *

"Be industrious, son," advised Papa Skunk. "Do not shirk your daily stink."

* * *

MONTHLY EPITAPH

Here lies the body of pilot Willy
Who thought the testing of engines silly;
Willy was hot
But his engine was not,
So here he moulders, Willy-nilly.

Homemade Racers

(*Continued from page* 37)

curricular entertainment and fun.

The annual Goodyear purse of $25,000 has furnished an incentive to many builders who might otherwise have skipped the headaches of developing small craft. The Continental Trophy race at Miami Air Maneuvers in January also offers a sizeable cash award to winners, and numerous small-scale local events have offered prizes for speedy midgets.

Even so, many of the builders don't break even. Bottom cost for materials for construction of a midget plane runs around $1,500. If special materials, high-cost engineering details and unconventional engine installations are used, the cost may be boosted to $5,000 or more. And if the cost of labor is added, the figure is rocketed way out of reach. That's why most of the building has been mainly a labor of love.

And it *is* labor. Most entries in the midget races take over a year to develop to the test-flight stage and often the time lapse between test and race is disheartenningly long. On the first flight of Art Williams' *Estrellita* the pilot didn't anticipate the sensitivity of control required for control surfaces of such small size. He was so startled by the handling characteristics that he elected to discontinue take-off—with considerable damage to the plane. Rebuilt again, Williams' plane lost its prop in the third lap of the Miami race in 1948. Two and a half years elapsed from the time he began work on *Estrellita* to the day he first finished a race.

Williams, incidentally, was beset by additional troubles on his way to the Cleveland races in 1948. His ferry pilot overshot the runway at Akron. Finally, he placed sixth (despite an overheating engine) in the 1949 Miami race. And, by improved design which added 10 m.p.h. to his speed, he came through in the money this year at Cleveland, clocking the course at 181.6 m.p.h. on his qualifying run.

When the Goodyear, the midget classic, was put on the National Air Races schedule in 1947, 12 planes started the race. This past fall, 39 of the runt racers entered the competition and 27 were first-time entrants. And even though the edge remains with professional aviation veterans who have first-rate equipment at their disposal, much construction takes place in Quonset huts set up by the entrants who include a Tennessee soap factory foreman, a California paint salesman, a statistician, an oil salesman, a power linesman.

One of the most unusual entrants in this year's race was Detroit's Lawrence Tech pusher, designed and built by the school's aeronautical engineering class. The designing, carried out as a class project, consisted mainly of checking Prof. George Martin's calculations. Eight of the students worked on their own time, with Martin supervising, to build the plane.

The pusher rests on two main wheels in tandem, close up under the pod, with

PLANE FAX

How Central Air Services Cuts Repair Bills

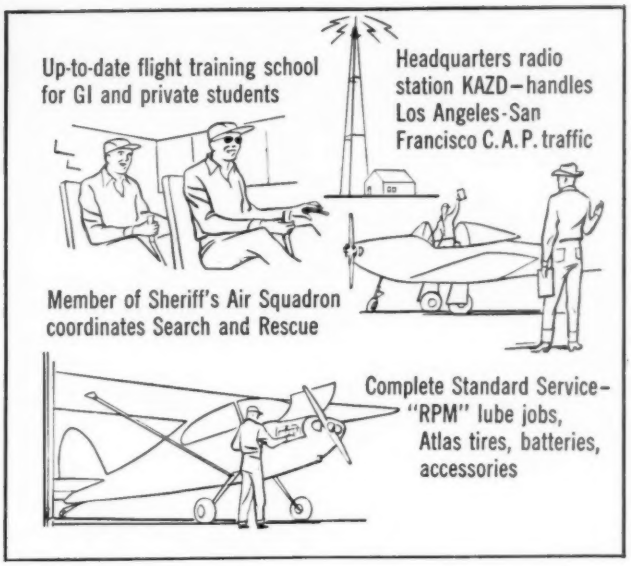
Frank E. Furlong, owner of Central Air Services at Furlong Field, Fresno, California, tells how RPM Aviation Oil helps cut maintenance costs on the 75 planes at his field. "We have used 'RPM' since it has been on the market and have never known what it means to have a sticky valve. That goes for our many customers, also.

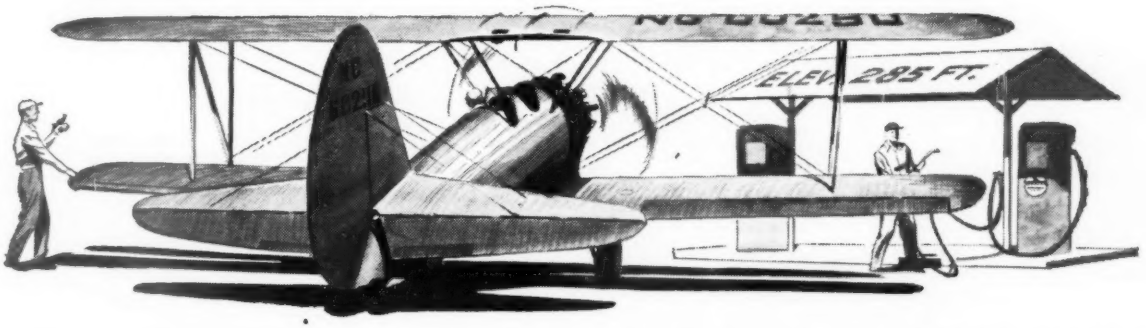
"Our engines have run many hundreds of hours on 'RPM' and maintenance has been kept to a minimum. We have an 85 H. P. engine that was torn down for a major overhaul after 1500 hours and the cylinders were worn less than a two-thousandth of an inch.

"After these wonderful results, it's a pleasure to recommend 'RPM' aviation products to all our customers."

Quick picture of

FURLONG FIELD Fresno, Calif.


Up-to-date flight training school for GI and private students
Headquarters radio station KAZD—handles Los Angeles-San Francisco C.A.P. traffic
Member of Sheriff's Air Squadron coordinates Search and Rescue
Complete Standard Service—"RPM" lube jobs, Atlas tires, batteries, accessories



Tip of the Month

"How to make your gasoline give you greater flying range"

"We've found that Chevron 80/87 Gasoline is so efficient that we can lean out the mixture in our small planes at high altitudes, which reduces the fuel consumption and lets us fly farther on a tankful of gasoline."

—Frank Furlong,
owner, Central Air Services, Furlong Field.

All "Furlong" planes have switched to new Chevron 80/87 Gasoline—now get peak power for less money

"We're all glad that Standard came out with the new Chevron 80/87 Gasoline," Mr. Furlong writes. "We're using it in our Pratt and Whitney 450 engines which once required 91/98 fuel. Now when we fly our BT-13 trainers and crop-dusting Stearman, we get full power without any detonation—with a lower-priced gasoline."

CHEVRON AVIATION GASOLINE

RPM AVIATION OIL

Standard Oil Company of California

tail wheels at the extremity of each boom and skids at the wingtips. A future modification will be to fit the main wheels with clamshell doors which can be closed after take-off. That would provide a clean surface with minimum drag, approximating retracted undercarriage (retractable gear isn't allowed in the Goodyear race.) The skid and tail-wheel arrangement on the model unfortunately adds to drag and increases the stability problem. With the center of gravity high and near the front wheel, there is no restoring moment to counteract tipping. Control in crosswind conditions is consequently an extremely sensitive operation.

The pusher's wing is fabric-covered with a single spruce spar. A solid V-shaped section runs forward from the engine to carry the torque and drag loads. The high wing was used to provide more wing area, act as a fairing for the engine at its trailing edge, and to put the air intake for the engine (below wing) in a high pressure area. Downdraft cooling is employed.

The plane cost $1,600, took eight months to develop from the planning stage to the finished model. The small shop in which it was built was crowded to within two inches clearance on either side of the wings. When completed, it was dismantled and reassembled at Wayne Major airport. Its initial flight was made just in time to meet the qualifying deadline at Cleveland and consequently there wasn't sufficient time to test the plane.

Because of insufficient testing, the pusher was flown at 70 per cent power and qualified at a low 128 m.p.h. even though the design speed is approximately 180 m.p.h.

The grand-daddy of home-made plane builders is S. J. Wittman of Oshkosh, Wis., who has been piloting his own models since 1924. In 1936 he built *Chief Oshkosh* which, as *Buster* (with new wings), took first place in the 1947 Goodyear race, clocking the course at an average of 165.857 m.p.h. "Chief Oshkosh," originally powered with a Menasco engine, flew a 100-kilometer course at 238 m.p.h. at Detroit in 1937 to establish a world record for that class. Other models built by Wittman include another racer, *Bonzo;* a two-place experimental plane with conventional design and 125-m.p.h. cruise (on a 75 h.p. engine); and a roomy four-placer with a 130 h.p. Franklin engine and a 130 m.p.h. cruise.

Witman, who is a former English teacher and operator of the Oshkosh, Wis., airport since 1931, uses a simple shoulder-wing design with small fuselage frontal area. His designs have consistently outclassed competitors and kept them in wonder. One clue to his phenomenally successful performance is feather-weight pilot Bill Brennand (108 pounds) who took first place in this year's Goodyear. Racing technique, says Wittman, is a major factor in trophy winning. The veteran designer believes the first plane to take the lead has a definite edge.

Newest Wittman development is his hand-made propeller. Props have always been a problem to midget builders since controllable pitch mechanism isn't allowed in the 190 cubic inch competition. Quick take-off is desirable (requiring high r.p.m.) but once in the air performance can be stepped-up with low r.p.m. In midget racing, a reading of 3,500 r.p.m. is not unusual. Wittman uses his own wooden propeller which he says approximates two-pitch performance. Under take-off load the blades apparently twist to low pitch for quick acceleration and, as the load is lightened in the air, twist back to reduce the r.p.m. in cruise or high-speed level flight.

Wittman's prop has sweptback blades but it is questioned whether the tip speeds developed are high enough to reach the .9 Mach number region where sweepback becomes effective.

Wing design on the Wittman planes is an adaptation of an NACA airfoil. Whether out of modesty or actual fact, he says that all a small plane designer needs to do is read up on NACA bulletins—"the know-how is all right there."

Other experimental installations on the midget racers include use of various types of wheel pants. Herman (Fish) Salmon, another of the country's top race pilots, estimates that pants can cut the wheel drag in half, giving speed increases up to 10 m.p.h. Though he won the Goodyear last year, Salmon dropped to fifth place this year. He flew a modified *Cosmic Wind* design, and tailed Vincent Ast who was flying *Ballerina*, one of the unmodified *Cosmic Wind* planes. Salmon had substituted a steel-tube fabric-covered fuselage, had raised the wing, and modified the empennage to give a lower ground angle. That cancelled out the advantages of a sleeker canopy installation and cylinder head fairing. Although Salmon upped his speed six m.p.h. from last year's winning 169.608, the Goodyear winning speed jumped almost eight m.p.h.

Advantage of superior exterior finish was shown by Keith Sorenson, who placed second in the 1949 Goodyear in his first attempt at the trophy. Sorenson's black-and-white *Deer Fly* has a fabric-covered plywood wing and a steel-tube fuselage design. It had the smoothest finish of any of the entries. That, coupled with flying skill (his qualifying time was only fifth highest), accounted for his happy performance in the finals.

Another design innovation appeared at Cleveland this year, and showed its advantage in adding higher speed and more effective control area. Al Foss used fairing over the space between movable control surfaces and fixed control surfaces. Another new feature, which eliminated the drag-producing bottom scoop and the fairing necessary on other models, was the big spinner on Jimmy Kistler's *La Jollita.*

For safety reasons, a stock model engine must be used in competitions. That eliminates the possibility of modifying the ATC model as shipped. Even so, ingenuity could raise the performance. Jet exhaust stacks have cropped up on a few runt racers, and some of the pilots have experimented with compounding fuel mixtures. At Cleveland this year, however, all pilots used standard 81 or 90 octane gasoline.

Many of the race contestants this year went back to their workshops, ready to begin work on additional improvements. These men, coupled with the growing list of home experimenters who enter the race each year, are somewhat of a novelty to U.S. private aviation. Next indication of their progress will be given at the January, 1950, Miami Air Maneuvers. END

15 YEARS AGO

FROM the December, 1934, issue of this magazine:

Ford Trimotors which inaugurated TWA's first coast-to-coast passenger service in 1929, were being replaced by Douglas Airliners. The *Trimotors,* "fast flying machines in the early days of U.S. commercial aviation," cruised at 110 m.p.h., had a top speed of 134 m.p.h. and carried 12 passengers.

France celebrated the 50th anniversary of the first round-trip flight made by an airship under its own power. In 1884, the airship *La France* (165 feet long and 27 feet in diameter) flew from Paris to Villacoublay and back. Propelled by a nine h.p. electric motor weighing 1,174 pounds, the *La France* attained a speed of 14 m.p.h.

The Bellanca twin-engined bomber, "one of the most highly developed bombing units in the service," carried a pilot, bombardier, two gunners, and 2,825 pounds of bombs and ammunition.

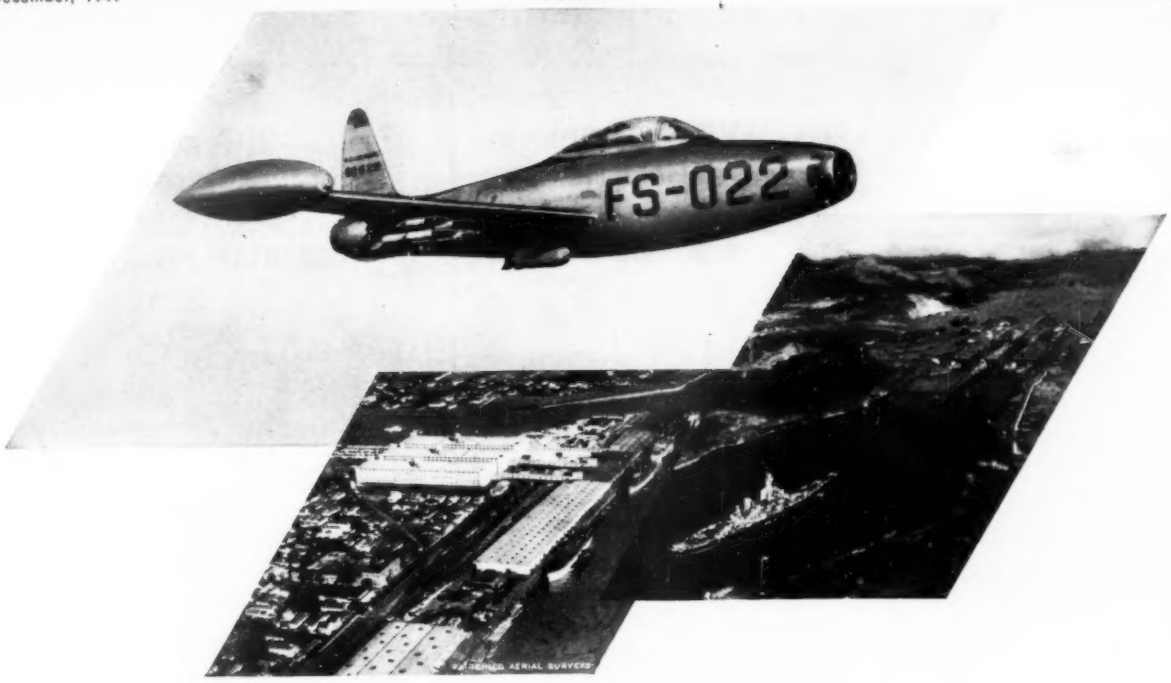
Powered by two Wright *Cyclone* engines, the bomber had a top speed of 190 m.p.h., cruised at 172 m.p.h. and had a maximum range of 1,500 miles. It could also be used for transporting cargo, troops (18 men), and litter cases.

"General William ("Billy") Mitchell is at bat again with new and original ideas on a flotilla of airships," the editor commented. "The general can always be depended upon for creating a sensation, and this time he has certainly created a furor in Washington."

The "Gross F 5", America's first three-place glider, made several successful trial hops. Pilot and student sat side-by-side with space in the rear for one passenger. An "airfoil spoiler" which had never been tried before on U.S. gliders, enabled the "F 5" to change its gliding angle and land in limited areas.

TWENTY YEARS AGO

William B. Ziff, publisher of FLYING, warned editorially that "lack of public confidence in aviation and its various phases is alarming. It is ample evidence that the sales methods adopted are entirely inadequate . . ."



THUNDERJETS OVER AMERICA

Way down yonder . . . high above cotton fields and tobacco lands . . . more F-84's are going into active service daily . . . broadening the protective scope of our U.S. Air Force patrols. ¶ Two new models of the

Thunderjet . . . the F-84-D . . . and the F-84-E . . . have been added to the Air Force's fighter arm . . . bringing even greater performance in speed, range and altitude for air defense . . . and for quick retaliation in case of need. ¶ Not just an interceptor nor an escort fighter . . . but also a deadly fighter-bomber, carrying two thousand pounds of bombs, high velocity rockets, depth charges or incendiaries . . .

in addition to a FULL load of fuel for any required mission . . . this is the THUNDERJET. ¶ Today, F-84's protect the vast Southern waterfront with its inland cities and farmlands . . . just as they are assigned to help guard our East and West Coasts and Northern boundaries. Proficiency of pilots and planes alike is kept razor sharp by

frequent maneuvers . . . highlighting the tactical requirements of independent air operations, as well as performing vitally important close support assistance to Army Ground Force troops. . . . . Republic Aviation Corporation, Farmingdale, L. I., New York

"This is the year of the Thunderjet"

REPUBLIC AVIATION

Makers of the Mighty Thunderbolt • Thunderjet • XR-12 • XF-91

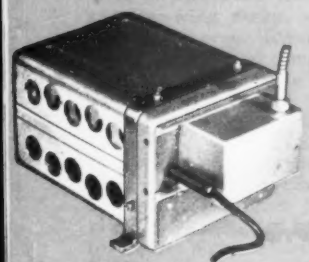
Lear OMNIMATIC

OMNISCOPE
Instantaneous VOR Indicator
Size: Standard Instrument Mounting

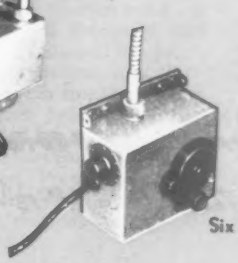
LTRA-5
VHF Transmitter Receiver Plus Low Frequency and 75 MC Marker Beacon Receivers
Size: 5⅛" x 6⅞" x 7¹¹⁄₁₆"
WT: 6 lbs. 1 oz.

LTR-5
VHF Receiver and Six Frequency 2 Watt Transmitter
Size: 5⅛" x 6⅞" x 7¹¹⁄₁₆"
WT: 5 lbs. 10 oz.

LR-5BN
Narrow Panel VHF Receiver
Size: 3⅞" x 6⅞" x 7¹¹⁄₁₆"
WT: 4 lbs. 4 oz.

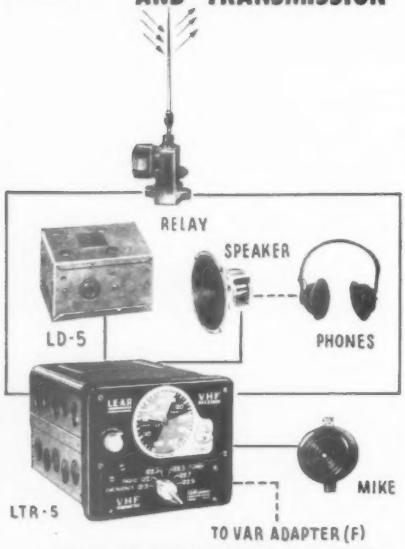


Remote VHF Receiver
Size: 5⅛" x 6⅞" x 10⅛"
WT: 5 lbs.



Cockpit Tuning Control
Size: 1⅞" x 3¼" x 3¾"
WT: 10 oz.

A — VHF COMMUNICATION COMBINATION AURAL RECEPTION AND TRANSMISSION

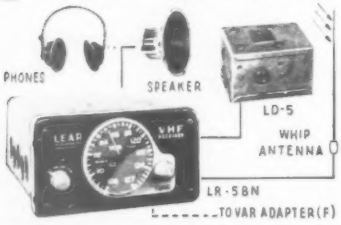


THIS COMBINATION GIVES

1—All VHF Tower and Radio Range reception facilities plus 6 frequency VHF transmission.

2—Only one antenna installation for both transmitting and receiving VHF communications.

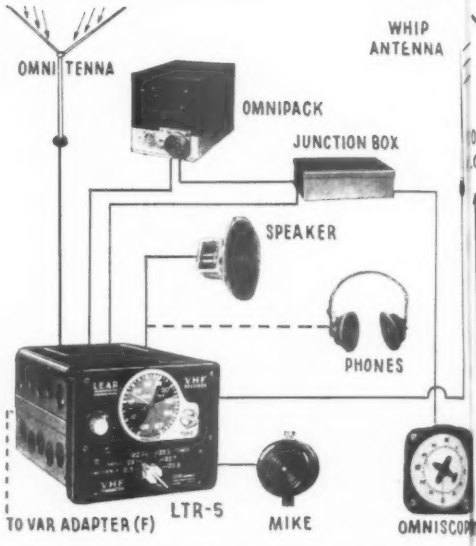
E — VHF AURAL RECEPTION EQUIPMENT



THIS COMBINATION GIVES

VHF Reception from Tower and Radio Range including weather reports, landing and take-off instructions.

B — VHF OMNIMATIC . . . AURAL-VISUAL RECEPTION AND TRANSMISSION — INSTANTANEOUS . . . AUTOMATI



THIS COMBINATION GIVES

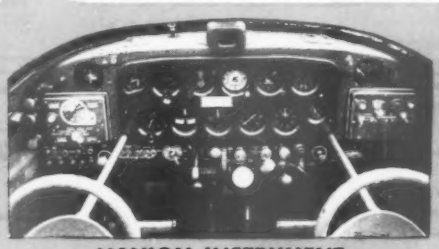
1—The **only automatic** omnirange navigating system.

2—All VHF Tower, Radio Range, VOR (VHF Omnirange Radio) reception facilities plus 6 frequency VHF transmission.

3—**Continuous, instantaneous** magnetic bearing indication from you to the tuned VOR station.

ORDER Lear VHF
NAVIGATING EQUIPMENT
by Specifying Combination
A, B, C, D, E
AF, BF, CF, DF or EF

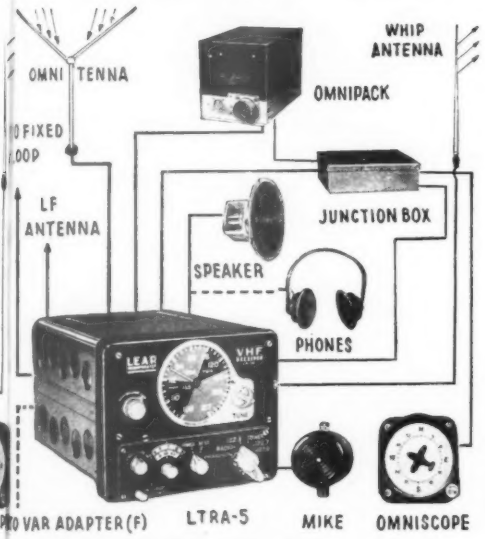
RT-10CH
Panel Hole Mounting
Six Frequency 2 Watt VHF Transmitter
Size: 3¼" x 3¼" x 7"
WT: 13 oz.



NAVION INSTRUMENT PANEL VHF INSTALLATION

VHF EQUIPMENT

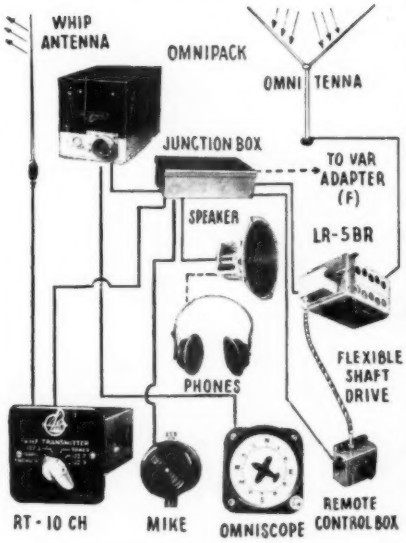
C — VHF DE LUXE OMNIMATIC 4 RECEIVERS AND TRANSMITTER — INSTANTANEOUS . . . AUTOMATIC



THIS COMBINATION GIVES

1 — The **only automatic** omnirange navigating system. 2 — All VHF Tower, Radio Range, VOR (VHF Omnirange Radio) reception facilities plus 6 frequency VHF transmission. 3 — **Continuous, instantaneous** magnetic bearing indication from you to the tuned VOR station. 4 — Low Frequency Radio Range, Entertainment broadcast and 75 MC Marker Beacon reception. 5 — Aural-Null direction finder on both low frequency bands. 6 — Simultaneous reception of VHF and low Frequency stations, and homing.

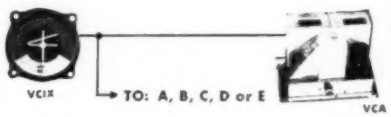
D — REMOTE CONTROL VHF OMNIMATIC... INSTANTANEOUS . . . AUTOMATIC



THIS COMBINATION GIVES

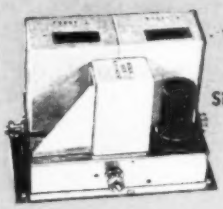
1 — **Remote Controlled automatic** omnirange navigating system including all features of B.
2 — Minimum instrument panel space requirements.
3 — Unlimited choice of VHF component location.

F — VAR ADAPTER



Fly and use the 4 Course VHF Visual Aural Radio Ranges and ILS Runway Localizers with the Lear VAR adapter.

VCIX
CROSS POINTER INDICATOR
Size: Standard Instrument Mounting



VCA-2 FILTER AMPLIFIER
Size: 4¼" x 5" x 8⅞"
WT: 6 lbs. 8 oz.

LCP-5
OMNIPACK
Omnimatic Power Supply 12 or 24 v—D-C
Size: 6¹⁄₁₆"x6⅜"x10⅜"
WT: 12 lbs. 6 oz.

LD-5

Dynamotor — 12 or 24 V—D-C—Continuous Duty
Size: 3" x 5¹³⁄₁₆" x 5 ¹³⁄₁₆"
WT: 7 lbs. 8 oz.

VHF WHIP ANTENNA

OMNITENNA

JUNCTION BOX

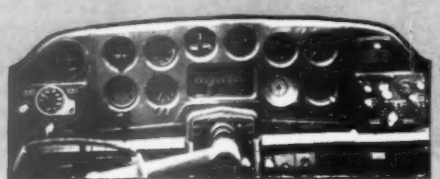
HEADPHONES

COAXIAL ANTENNA RELAY (75 OHMS)

6" SPEAKER

4" DIA. FIXED LOOP ANTENNA

MICROPHONE



BONANZA INSTRUMENT PANEL VHF INSTALLATION

OTHER *Lear* VHF
Combinations Available

LEAR INCORPORATED

110 IONIA, N.W., GRAND RAPIDS, MICH.
11916 W. PICO BLVD., LOS ANGELES, CALIF.

BETTY SKELTON'S NOTEBOOK

Pert, pretty Betty Skelton and her red midget biplane, the Little Stinker, are a familiar sight to airshow crowds all over the U.S. An internationally known pilot at 23, Betty has held the title of Women's International Aerobatic Champion for the past two years. Her column, "Betty Skelton's Notebook," will appear regularly in FLYING.

TRIP TO ENGLAND

Several months ago the *Little Stinker* and I went to England. The most harrowing part of the jaunt was watching my one and only airplane being dismantled for shipping. In no time flat there were nothing but small pieces scattered all over the Newark hangar. Then the mechanics casually scooped up the pieces and tossed them into a box that bore an amazing resemblance to an outsize casket. Next time I saw the "remains" was from the sundeck of the *Queen Mary*.

There was the casket—*my plane*—with at least 100 feet of altitude and no pilot! It was swinging above the dock on one thin rope. I spent the next couple of hours feeling quite shaky.

At London's Gatwick Airport, I called the tower for test-hop instructions. Was told to taxi out the "perry track," and take off. For landing, I was to enter the "circuit," and wait for a "lamp" from the "caravan."

England has no midget planes, so the *Stinker* caused quite a sensation. "Flick" rolls (their term for snap rolls) are illegal there, and I couldn't do enough to please them.

The International Air Pageant was a big success, but it took me a full two days to recover from the shock of seeing the French four-plane aerobatic team do a perfect outside loop in formation!

Couldn't get too enthusiastic about crossing the Irish Sea after everyone remarked that the *Stinker* was the smallest plane ever to make the crossing. Was over water (I can't swim a stroke) for over an hour, and just as soon as I was out of gliding distance from shore, the engine went into "automatic rough."

The reception in Ireland was out of this world, and I couldn't complain about flying the airshow there in drizzling rain when over 5,000 people sat in the same rain for over four hours just to see some flying.

Well, all good things come to an end and soon it was back in the casket for *Stinker*. Thanks to all the wonderful people in England and Ireland for the most pleasant experience of my life.

NATIONAL AIR RACES

Sure was nice landing in Cleveland and having BILL HARRINGTON as usual take such good care of my reassembled airplane.

FISH SALMON was the superman of the week. . . . First he popped in from the West Coast to qualify his midget, then hopped an airliner back to the coast just in time to take off in the Bendix Race for Cleveland again. . . . Seconds after he landed in Cleveland, he was zooming around the Goodyear course. STEVE WITTMAN and BILL BRENNAND just chuckled when I asked why their midgets are usually winners. Steve's only comment was that *Buster* and *Bonzo* were a "little more modest this year." I finally decided he meant the pants were a new addition—wheel pants.

CHICAGO STRIP

Pop will probably say I'm talkin' when I should be listenin'—but I believe somebody should take up the cudgel for Chicago's lakefront airstrip. I don't like to pay landing fees, but I'm not going to be stubborn when a little common sense shows me I'm saving time and money by using that strip. Before Meigs Field was built, I always landed at Chicago Municipal, paid $2.65 for a cab and wasted over an hour getting into the Loop. Now I pay 55 cents for a cab and get to my hotel in six minutes! If you drove your car into the Loop, you'd pay as much to park it as Meigs Field charges.

Betty Skelton

Short-Field Landings

(*Continued from page* 39)

use of a slight slip allows the pilot better visibility in the nose high attitude and is helpful in short field work. Maintain approximately 10 to 15 m.p.h. above stall speed, and as you cross the obstacle or boundary reduce power to just above stall speed. Chop power just as you approach the near end of the strip.

You may bounce a bit in power approaches but that's okay. Remember, however, to apply power quickly if you "feel" you are settling too rapidly. Go around if you are not sure. The exact angle of descent can be determined in advance according to the wind factor and can be estimated on your initial "low drag."

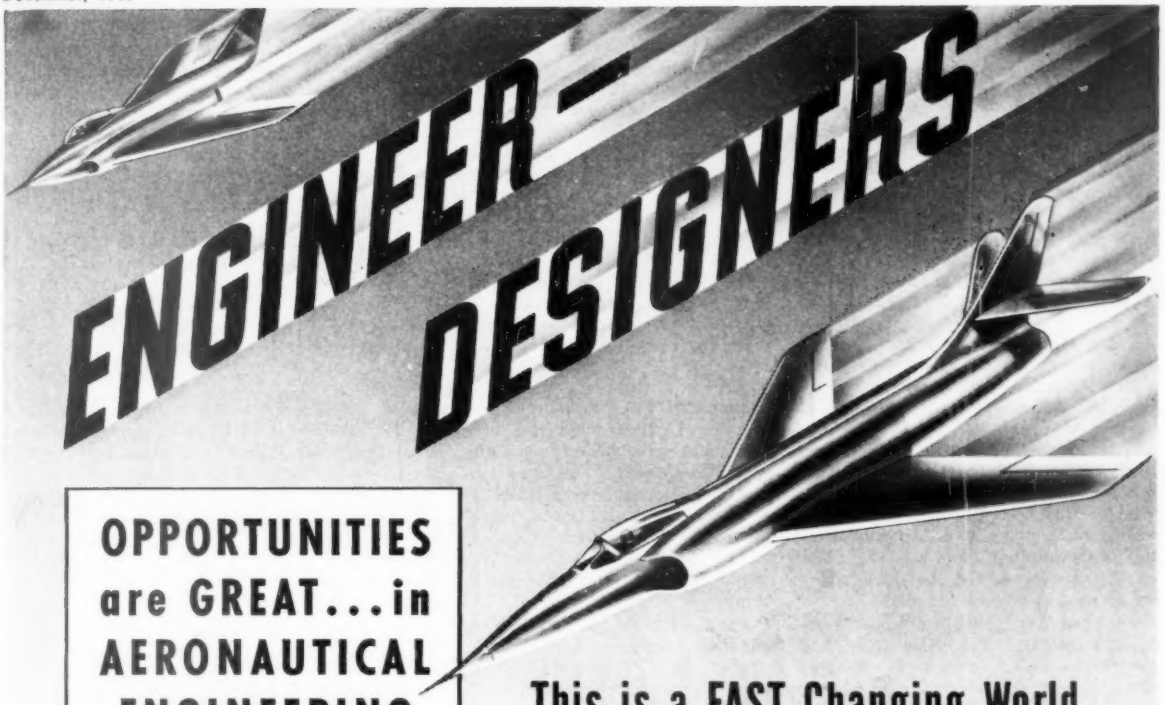
As you come around for your final approach watch the touchdown spot, correcting your altitude by use of throttle. Only constant practice will tell you just how much power to add or retard for this control. Temperature and humidity are also important factors and experience is again the best teacher. You will find that in hot weather the power approach will give you the best control over ground turbulence and prevent the frequent "drop outs" we hear so much about.

Once on the ground, brakes should be used as soon as possible and the aircraft kept under control. Remember to keep to the exact line of roll that you checked as being safe from the air in your "low drag." Before take-off get out of the plane and look the strip over. Align yourself with a distant object and pace off the take-off lane, checking its approximate length and observing the surface for holes or obstacles on the ground.

When you taxi back use the same strip and "S" all the way. Go slow and watch for low bushes which might tear the fabric on the underside of your fuselage. And when you turn for take-off make sure you use all of the strip possible.

Use a maximum performance take-off out of short fields for safety's sake. And do so even if it will only give you practice for the next time. This type of take-off gives you a minimum ground run with a maximum angle of climb. To execute the maximum performance take-off apply the brakes, add full power and full back-pressure on the stick. Then open the throttle slowly until full power is reached. Release the brakes, allow the airplane to roll two or three lengths and relax back-pressure. As the airplane accelerates, apply forward-pressure to raise the tail (help it; don't force it off the ground!). As speed increases, apply back-pressure slowly until the plane leaves the ground. The attitude at which the airplane leaves the ground will determine the climb angle. Again, wind factors, temperature and humidity change the ground run and the effect of lift.

Short field techniques can be modified of course. An understanding of basic principles is essential, however, for all pilots who operate in rural areas. A quick review of the principles, particularly the power approach over a barrier to a panel on your local airport, will be flying time well spent. END



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F-12

I Learned About . . .

(*Continued from page 44*)

accessible field, I decided to chance the letdown whatever the risk.

I lowered the nose slowly and directed all my attention toward the instruments. I was flying instruments in a plane never designed for that purpose. I had to keep an eye out for lights of other planes which might be in the overcast with me. And had to check gas every few minutes.

At 800 feet, I leveled off and took a good look around. I couldn't see anything. Since the terrain was such that further letdown was possible, I descended another 300 feet. This time I banked the plane up steeply several times, taking my time and making a thorough search for lights below. Although the beam indicated I was directly above the airport, and the city a scant four miles northwest, I could see nothing. Visibility extended no farther than my navigation lights. The effective range of the landing lights was about two feet. From everywhere, the thick, soggy grey pressed in toward the plane.

Once again I climbed through the overcast and headed west. The front had moved from west to east, so it appeared logical that I might have a good chance of getting out of it—if I could fly straight west long enough to reach clear weather. I stood a good chance of setting down on a highway or a field near a lighted village if I could hit the better weather.

After flying west on top of the thick cloud layer for about a half hour, I finally spotted a hole. I circled it—and spotted a dim light far below! I spiralled down around it, hoping the visibility would be good enough to enable an emergency landing.

Evidentally the light came from an automobile. I tried to follow the highway, hoping it would lead to a town. But, though I was only 400 feet off the ground, I couldn't see anything except the dim moving light. I soon ran into ceiling zero conditions again and was forced to pull up to a safer altitude. Twenty minutes of gas remained, and there was no apparent means of getting the plane down safely. Once again I began a descent, going down to 400 feet without catching the faintest flicker of light. I knew then that there was no alternative. I had to jump to save my life. Suddenly my stomach felt tight and knotted. I could feel cold sweat forming on my forehead. I wondered whether the tail assembly would smash into me after I went over the side.

Pulling up to 3,000 feet, I flew along in level flight, leaning the mixture as much as I dared, conserving the fuel as much as possible. I had been in the air for 3 hr. 30 min. I checked the gas, discovered I had about seven gallons remaining. That would last about 12 minutes. Just then, my engine coughed and died. I froze in the seat. It caught again, just as I was sliding the canopy back. I had pulled the mixture control too far back. I advanced it and flew along, dreading to make the jump.

But slowly the panicky feeling of desperation subsided. I tried to figure the angles. What if I landed in the Mississippi River, which wound through the countryside below? Would it be possible to land on instruments—a crash landing? Nope; certain suicide.

I remembered the times I had carelessly handled the parachute. I remembered slinging it into the locker after missions, thoughtlessly dumping it in the dirt when I took it off. I started to reach down to check the re-pack inspection card, then drew my hand back. I didn't have the nerve to look; I was afraid I'd find it was months old. Taking no chances, I sat there and practiced reaching for the ripcord, just to make sure I wouldn't fumble when I did jump.

The engine coughed again, and I knew I had about two more minutes. Deliberately, I picked up my maps and Form 1, opened my flight suit, and tucked them inside. I zipped the suit shut with a numb, detached air. I was moving and thinking methodically. I shoved the canopy back as far as it would go, peered down into the blackness on either side of the cockpit. Then I switched on every light in the plane, and waited.

The gas gauge registered zero, and the time for final decision was at hand. I pulled my hat down tight and started to get up. The slipstream tore at me. Sitting back down, I realized I had no definite plan for getting out of the plane. It didn't seem to make much difference at that point.

I idly trimmed the ship for level flight, thinking it might make a successful crash landing by itself. I leaned out the right side then, and tried to roll out. It didn't work. Next I leaned out the left side, staring down into the black, apparently bottomless mass below with a feeling of icy dread in the pit of my stomach. I pulled my legs up under me, draped myself over the left side of the cockpit and pushed—hard. I went over quickly as soon as the slipstream caught me. The horizontal stabilizer went by like a flash as I tumbled into space.

There was no sensation of falling. I reached for the ripcord, found it immediately and pulled it with every bit of strength in my right arm. Nothing happened. Then, after what seemed an eternity, I felt a terrific jerk. It knocked the breath out of me. Opening my eyes I could see the dim outline of the parachute canopy above—but nothing below. I clenched the ripcord in one hand, my hat in the other, and continued my drop.

I was intently peering toward the ground when I heard a plane's engine. It seemed to come from directly behind me. I tried to swing around to face it, but couldn't get the parachute to respond. Out of the corner of my eye, I could see the navigation lights of the plane I'd just abandoned. It was descending in gradual, sweeping spirals. It looked like I was right in line with the next big sweep!

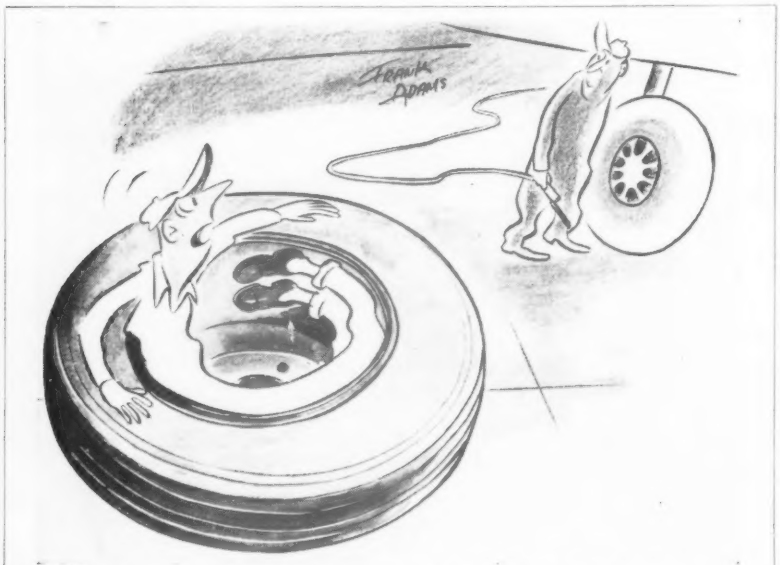
Then the sound of the engine died out, and the lights disappeared. In a few seconds, I could again hear the engine. The noise became louder. I grabbed at the shroud lines and attempted to spill the air out of the canopy, to get away from the plane. I managed to turn slightly, just in time to see the craft roaring toward me! I hauled madly on the lines, spilling as much air as possible from the canopy. The plane loomed from the mist, and hurtled past—less than 20 yards away.

Shortly after it went by, I heard the engine miss, then quit. A light rain began to fall. And, weirdly, I began to worry about falling in a water puddle.

Shortly after I hit the earth I was picked up, with no ill effects.

But from that flight I gained something I should have already possessed: respect for weather. I learned to stay on the ground whenever marginal weather is expected at any point along a flight route.

I was lucky once. Sometimes luck doesn't last. END



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YOU CAN DEPEND ON

Cessna 140A

(*Continued from page 29*)

have grey seats with green leather trim.

An 80-pound baggage compartment behind the seat is covered with a metal shelf, making a handy spot for magazines, maps and small packages.

Price of the 140A is $3,695 with a 90-h.p. Continental engine. With an 85-h.p. engine the price is $3,495. Last year the 140 was available only with 90-h.p. engine and was priced at $3,345.

I flew N9489A, a 90-h.p. 140A, at the New Castle Air Base near Wilmington, Del. Superior Skyways, Cessna's dealer in the Wilmington area, had a new 170, 195, and older 140's available for comparison with the new all-metal two-place plane.

Cessna advertises the 140A, 170 and 195 planes as little airliners. With their shiny all-metal skins and luxurious interiors the 1949 planes parked on the line at New Castle did look like miniature airliners.

During my check flight in N9489A, John Ward, manager of Superior Skyways was passenger and co-pilot. Together, our weight plus full gas tanks and baggage brought the 140A to full gross weight of 1,500 pounds. Empty weight is 900 pounds, giving a 600-pound useful load.

The wind was west at 10 m.p.h. The 90-h.p. Continental fired immediately when I pulled the starter button. The two gas tanks, one located in each wing, were full as indicated by the gauges at the top of the cabin. Cessna has changed the tank selector valves this year to four positions instead of three on earlier model 140's. It is now possible to feed gas from both tanks simultaneously. Cessna recommends take-offs and landings with both tanks on.

N9489A was equipped with two-way radio for operation at New Castle, which is an airline terminal. I called the tower for take-off instructions and the earphones vibrated with:

"Cessna 89 ABLE cleared to taxi out for take-off!"

The steerable tail wheel provided ample control on the ground with the 10-m.p.h. wind blowing. Visibility over the nose is satisfactory as in earlier model 140's, but not quite as good as in the 170 Cessna.

The new 140 was quiet on the ground compared with other all metal planes I have taxied.

Mags checked out okay at 1,500 r.p.m. and the tower rattled the earphones again. "Cleared for take-off."

At full throttle the 140A accelerated rapidly and we were in the air in exactly 12 seconds from a standing start. The rudder was extremely sensitive during the take-off roll and the slightest pressure in either direction brought the desired effect surely and quickly. The 140A seems to take off best from a tail low attitude. Bringing the tail up more than a few inches creates a negative angle of lift and causes a prolonged and bumpy take-off run.

I left the wheel in neutral position until full throttle was applied, and waited for the tail to come off the runway a few inches. Then a little back pressure and we were airborne.

I had no accurate means of measuring the take-off roll in feet. The mile-long runways at New Castle certainly would be ample for several take-offs and landings in a straight line in the 140A.

I flew B-26's at New Castle during the war and used a major portion of the mile runways for each take-off and landing. The Cessna 140 made the airport appear in its true size to me for the first time. The 140A requires scarcely more than the runway width for either take-off or landing.

I timed several climbs at 2,300 r.p.m. and 70 m.p.h. indicated speed. The Cessna climbs at better than 700 f.p.m. up to an altitude of 2,000 ft. above sea level. Cessna advertises a climb from sea level of 690 f.p.m. This is with a McCauley metal prop available as extra equipment for an exchange price of $70. Standard equipment is a wood prop. N9498A was equipped with a metal McCauley propeller and bettered the advertised rate of climb by more than 60 f.p.m.

Cruising speed, too, proved to be better than advertised. Cessna claims "over 110 m.p.h." I clocked the plane over a 40-mile measured course cruising at 2,000 ft., 2,300 r.p.m. The airspeed indicated 112 m.p.h. and the round-trip groundspeed 20 miles into the wind and 20 miles downwind averaged 114 m.p.h.

With a gasoline capacity of 25 gallons and an estimated consumption of just under six gallons per hour this gives the 140A a range of 4½ hours and more than 500 miles. The 1948 model 140 was at least five m.p.h. slower than the all-metal plane. Cruising speeds with pilot alone are probably even higher than the 114 m.p.h. in N9489A. I checked all performance at the plane's maximum gross weight.

I checked stall characteristics at 3,000 ft. with 1,800 r.p.m. The 140A power stalls at less than 30 m.p.h. The S.F.I. buzzes its warning at 40 m.p.h. and the plane continues to hang on and hang on until the air speed needle reaches its minimum reading. There is ample buffeting to warn of the approaching stall. Aileron control remains surprisingly good throughout all stall maneuvers.

Without power the Cessna falls off at 35 m.p.h. and the S.F.I. buzzes at 42 m.p.h. With full flaps lowered and the engine idling the air speed drops to 30 m.p.h. again before the airplane's nose falls through.

In all cases the stall warning indicator sounded a warning eight to 10 miles above actual stalling speed. There is no

MEXICO'S OLDEST AIRLINE

IN THE early 1920's, crude wooden crosses erected along jungle trails marked the graves of paymasters who had been waylaid and robbed while traveling to isolated Mexican oil fields.

The bandits killed and plundered until August, 1924, when George Rihl, a Tampico banker, started a company to deliver the gold coins by air. He bought three open-cockpit Lincoln *Standard* biplanes and used them on the 92-mile route from Tampico to Tuxpan.

That's how Mexico's oldest and largest airline, *Compania Mexicana de Aviacion*, got its start—25 years ago. Today, CMA employs over 1,500 persons and has a fleet of 15 DC-3A's and five DC-4's. They cover a 5,137-mile system.

In addition to passenger service, the airline carries Mexico City newspapers to all parts of the Republic, transports silver and paper currency to outlying communities, and hauls everything from baby chicks to baby grand pianos.

Last year the airline that got its start because of highway brigands received the new Inter-American Safety Award for operating 130,445,320 passenger-miles without injury to passengers or crew members.

"Without my Sperry Gyrosyn I couldn't have won!"

James Stewart and Mrs. Stewart congratulate the winner. Stewart owns the plane.

Navigating solely by dead-reckoning with the Gyrosyn* Compass, Joe De Bona at the controls of his F-51-C "Thunderbird" set a new race record of 470.136 miles an hour in the 1949 Bendix race.

"I was able to 'steer to a degree' with the Sperry Gyrosyn," De Bona said. "After setting the Gyrosyn at take-off in California to insure the best 'take-off heading,' I climbed to 27,000 feet and navigated a great circle course entirely by this instrument. To confirm my 'on course' accuracy, I used visual checks along the way.

"For example, I dead-reckoned about 850 miles to Colorado Springs, and computed a course 10 miles south of the city. It looked like about 6 to 7 miles south when I passed over. Later, my course called for a heading which cut between Goshen and Ft. Wayne, Indiana. When I got there, I split the two towns accurately as planned."

This transcontinental speed dash tests the skill of the pilot, and the flying ability and stamina of his plane. In winning the 2100-mile race in 4 hours and 16 minutes, Joe De Bona proved that he had both. And in flying at a speed where a minute means about 8 miles, he was able to prove once again, the importance of pin-point navigation and the Gyrosyn Compass.

Joe De Bona

1949 Bendix Trophy Winner

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tendency for the 140A to fall off on a wing during any type stall. Stalls from climbing turns were executed safely and the large ailerons again proved their effectiveness in quickly righting the plane from any angle even during a stall.

The best gliding speed seems to be about 70 m.p.h. If you are approaching the runway too high the flap handle between the seats is convenient and brings quick response. With full flaps lowered the glide becomes steeper and affords an excellent view of the runway ahead. The rate of sink and angle of descent can then be controlled with the throttle.

After lowering full flaps, set the roll trim adjustment to a slightly tail heavy position. The Cessna lands smoothest in a three-point attitude. Slow the glide from 70 to 60 m.p.h. as you cross the edge of the runway and gradually assume the attitude you had while taxiing. This is with the nose approximately on the horizon. If you level out within five feet of the ground, the 140A will make a good landing for you. The plane does not fall out but hangs on, cushioning the descent to the runway. I have previously discovered this hanging on tendency in the larger 170 and 195 Cessnas.

The large ailerons provide an excellent safety feature during landings in gusty weather. The wing tips just don't stall out and aileron control remains effective throughout the landing stall. If a wing gets down due to a gust or poor pilot technique, opposite aileron will bring the wings back to level quickly. With flaps fully extended the 140A touches the runway at about 40 m.p.h. The landing roll is short and you can use all the brake needed without much fear of nosing over. If you prefer to land without flaps the 140A slips nicely.

All factors considered, the new all metal 140A is a worthy baby brother to the larger Cessna Models 170 and 195. You may be interested in some prices on extra equipment available for the 140A. A cabin heater costs $24.50. Two way radio lists at $243. Wheel pants do a lot for looks and streamlining at $50. Landing lights cost $25 and this year fit in the leading edge of the wing. In 1948 the plane used a Grimes retractable light.

The control wheel has no center spoke. Indirect instrument lights are provided as standard equipment. The plane is quieter due to improved soundproofing, and a new motor mount reduces vibration considerably.

My personal suggestions for future improvement would include:

- An attempt at better ground visibility while taxiing. The 170 is superior to the 140A on this count.
- Incorporate the 170 seat adjustment in the 140A. The tilt adjustment for the back is satisfactory, but in order to slide the seat forward or backward it would be necessary to land and get out the tool box.

The all-metal 140A offers the two-place plane prospect airline comfort, a real pay load allowance, all-metal construction for safety and low maintenance. Certainly not least important, the Cessna is easy and safe to fly and exceeds manufacturer's performance claims. END

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Gene Autry

(*Continued from page* 31)

hearing slated in Austin, Tex., the following morning, 1,000 miles away.

The court hearing didn't end until 5 p.m., yet they were in Hollywood long before midnight. Gene worked 18 hours this second day and at noon the third day out of Mandan he was back in the saddle again at Spokane, Wash. Then, in successive days, to Yakima, Everett, Victoria, Vancouver, Seattle, Tacoma, Portland, and return to Hollywood.

This fantastic schedule explains why the airlines would fall short of Autry's need. It also indicates why the twin-engined aircraft is more practical than a smaller single-engined job, for Autry flies 65 per cent of his time at night and 50 to 75 hours of night instruments annually.

Gene thinks his wartime flying was the luckiest thing that ever happened to him. With six years of rather limited experience, he scorned the chance to cash in on his fame for a commission, and became an Army Air Force enlisted pilot with the Training Command in 1942. He was based at such places as Luke, Thunderbird, Skyharbor and Love Fields, and hit Africa, the Middle East and India after transfer to the ATC. He ferried AT-6's, BT-13's, A-24's, AT-11's and UC-78's, taking his turn in sequence and learning navigation and weather from coast to coast.

Most of his time came on C-47's, where he wound up as a Flight Officer first pilot after jerking gear for a couple of veteran airline captains, Hal Murray and Clarence Chiles.

"That's where I landed in clover," Gene says. "Those men taught me how to fly."

Today Gene's personal flying is done on airline technique, following the standard procedures all the way through. "I learned from them to know my equipment and its limitations and never fool around trying to fly part contact and part instruments. If weather is forecast ahead, we file IFR and get an assigned altitude before take-off, even though it might be CAVU at the time."

With something like 4,000 hours, Gene has logged nearly 300 hours of instrument time and 1,000 hours at night; carrying a commercial ticket, instrument card and ATR.

Gene's first plane was a Monocoupe bought in 1936. Since the war he has owned a Cessna UC-78 and a Beech AT-11 and a C-45. He bought the 1947 Beechcraft to get hydramatic propellers. The C-45 had an autopilot and he used it extensively to relieve the tedium of long hops when he wasn't getting much rest. Friends kept arguing that the pressure was too great. One tour lasted six weeks and required 18 hours of work a day with regular flights at night.

A Texas friend insisted that Gene arrange to "borrow" Herb Green, a well known Texas executive transport pilot, to fly some of the trips while Gene slept.

Herb proved to be an ideal business and press representative for the flying cowboy and the loan became permanent. But Green is not a "safety" pilot. He gets paid wages commensurate to a skilled public relations counsel, many notches above a "co-pilot's" pay.

When Gene is working day and night, Herb does the flying with Autry asleep in the back end. On instruments, and especially ILS or range let-downs, both pilots are in the cockpit with either doing the flying and the other navigating and handling the radio and gear.

They balk at nothing but thunderstorms and severe icing. Either pilot flies around bad weather or lands short to sweat out a change in conditions. You can fly around a lot of stuff in a 200 m.p.h. airplane, and Gene's craft might go to Dallas, Tex., via El Paso, or Albuquerque, N. M., or even Salt Lake, to avoid extensive thunderstorm areas or icing.

Herb reports that gas, oil, maintenance and overhauls average about $25 an hour at 500 hours annually, with insurance, storage, depreciation, etc., about double that. Gene carries $100,000 liability on each seat, plus full aircraft coverage.

Flight plans are usually based on a 175-m.p.h. block-to-block speed, with a cruise of 200 true at 8,000 to 10,000 feet, using 260 h.p. per engine at 1800-1850

During war, Autry served as enlisted pilot, later flight officer, with ATC in the Middle East, African and Indian theaters.

r.p.m.s. On most airport take-offs they use only 400 h.p. per engine and reduce power at 120 indicated, which usually takes 35 seconds.

Autry says that with the D-18S you are in good shape for single engine performance at 120 and okay even at 100. The rudders don't go out nor does the plane swerve if an engine whoofs. However, they have never had to feather one yet.

They fly the pattern at 120 prepared to jerk gear if they get cut out, or have a single engine 'go 'round,' drag final at 100 and land tail low on the wheels about 80, except on very short, dirt fields where they use full flaps and power, dragging final at 80 indicated, to three point around 65 to 70 m.p.h.

Unlike the older models, this Beech three-points nicely, with minor modifications that set the gear forward and altered the stabilizer to correct what Gene says is a slight tendency for the tail, on older D-18's, to sell out in three-point attitude at low speeds.

The Beechcraft has a full complement of instruments and radios, and will soon include an Omni receiver which both pilots think will be a great boon to private flying.

IFR, they fly airways. In contact weather they go direct by dead reckoning and ADF maps. A flux gate compass in the right wing tip assures correct compass readings on any heading. Frequent fixes are made on the ADF even in good weather.

On the rare weekends he can get away, Gene and his wife Ina take the Beechcraft by themselves and fly for fun and relaxation. Herb reports that the lady does a nice job of flying cross-country.

Lightly loaded, the Beechcraft can tote enough gas for seven hours, but Autry seldom extends a flight beyond six hours. With members of his troupe aboard, and a heavy baggage load, they watch the gross weights and center of gravity carefully and make additional stops for gas.

Autry has a full-time crew chief, Jimmy Clarke, who flies some trips but more often stays home where he keeps two extra P&W *Wasps* in major overhaul for engine changes and works on ideas that Gene has for improving the airplane.

One thing Clarke did was rig an airline-type instrument lighting system to replace the factory job. He also solved the problem of the front window working open and whistling.

Getting transportation to town even plagues Gene Autry sometimes.

Flying into the Lone Pine, Calif., location for a new western picture late one evening, Gene found it was a little on the dark side to tackle the shortest field they use regularly, so they detoured to a former Government air base and landed there. It was abandoned, of course, and 10 miles from town, and there was no car to meet them.

There was Gene, dressed in faded blue denim jeans, old work boots and a sweaty shirt. He had been working out his horses at his ranch all day, wearing radically different garb than he does as a screen life cowboy.

He and Herb hit the highway with no alternative but thumbing a ride.

Dozens of kids who whoop and holler every weekend at the Gene Autry pictures, rode past with their parents, all failing to recognize their favorite western star.

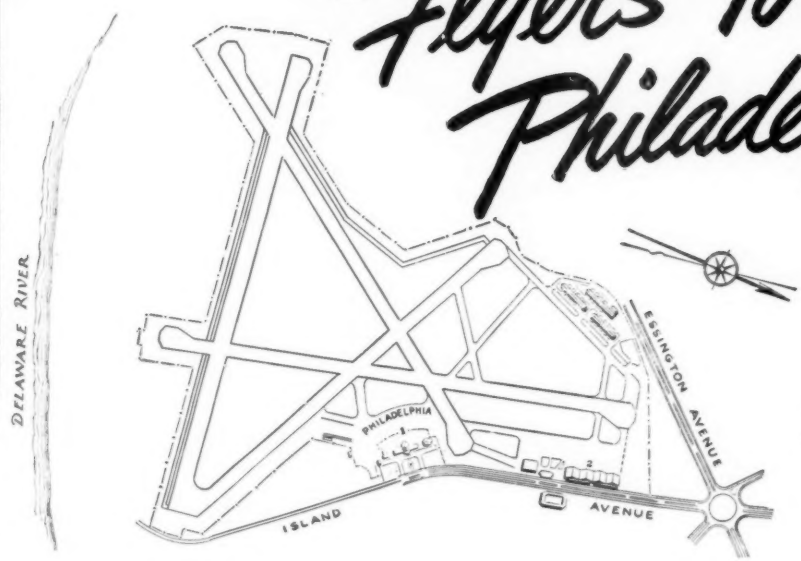
Finally, an asthmatic and venerable jalopy loaded with baggage, kids, husband and wife, going in the opposite direction, chugged to a stop and a man wearing range rider's garb stuck his head out the window.

"Hey, feller, ain't you Gene Autry?"

Their samaritan was a kindred soul, a travelling cowboy singer who did a 180 and carried Gene and Herb back down the road to Lone Pine. Herb carried kids on his lap and Gene suffered paralysis of the arm as he held their heavy suitcase outside the door.

"Well," he says, "you can't win all the time, and we did learn that there's a few really decent men left in the world. Besides, it's what we might consider one of flying's inevitable occupational hazards and if it hasn't happened to you yet, it will." END

Flyers to Philadelphia



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Combat Christmas

(*Continued from page 21*)

down the runway. Each plane in turn did the same thing, until we were all airborne. The English countryside looked eerie, with its fog lying in the hollows. The planes were just black objects in the coming sunrise. Working the throttles and controls, I moved slowly up into the formation and took my place on the wing of my flight leader. After the Group had formed, we headed for the rendezvous point, where we were to meet the other Groups that were to make up our Wing.

As we crossed the English Channel, the air was literally filled with heavy bombers. There was no doubt about it, this was a big raid. In a short while we reached the fighter-belt and yet not a fighter was in sight.

Clouds began to build up below us, and in a short while they completely covered the ground. The first enemy fighters appeared just as we neared the target but didn't attack our group. I could hear Boswell, our bombardier, calling on the intercom, "Okay, put on your oxygen masks, we are going up. Give me a call when everything is okay." We were climbing in order to get over the flak near the target area.

We leveled out at 26,000 feet, our bombing altitude. Then the flak batteries began to open up on us. The air was filled with ugly black bursts.

We passed over the target without seeing it for it was completely covered with clouds. It made us mad as hell, for we had gone clear across France with no target to bomb. We immediately made a turn to the right and headed for our secondary target near Paris.

About five minutes away from the target, I saw eight Nazi fighters. The sun glinted on their shiny surfaces.

I pressed the mike button and called the top gunner. "Smitty, there are eight Focke Wulfe 190's, high, at two o'clock!"

"Roger," he answered from above me. "I got 'em. They're too far out, but I'll keep my eye on 'em."

We were flying tight formation, demanding all my attention. I tried to forget the FW's and let the gunners take care of them.

A split second later, the whole front end of our B-17 exploded. Smoke poured into the cockpit. As I reached automatically for the bail-out alarm switch, I saw Morris Weinberg, the navigator, and Vance Boswell, the bombardier, lying on the floor, covered with blood. We couldn't jump and leave those two guys in the crippled plane.

My control column had apparently been severed so I yelled to Bill Freund, the co-pilot, to try to catch the formation below us. If we could reach them, we could fly alongside for protection.

I was having a hard time breathing and reached up to adjust my oxygen mask. It was only a shredded strip of rubber! The mask had been blown completely off my face. I yelled for Bill to head down, fast. I don't know what our rate of descent was. The instruments were hanging like confetti from the demolished panel.

The formation began to pull farther away from us and it became obvious we couldn't catch them. We were over enemy territory—alone—and I knew the Nazi fighters would spot us again. When they did—well, we were bound to get it, sooner or later.

I felt a hand on my shoulder, and looked around. There stood Weinberg—blood was streaming down his face, and his left eyeball appeared to be dangling from the socket. I could see he was in agonizing pain, but I couldn't help him. He was trying to say something but the wind howled through the shattered cockpit, and I couldn't understand him. Finally, leaning closer, I could understand. "Switzerland."

That was it! Head for Switzerland! And, always the navigator, he continued. "Fly 200°." We were losing gas out the bottom of the wings, and probably had enough fuel for another hour. Maybe two. Switzerland was only about 45 or 50 minutes away.

Weinberg went back down to his compartment, to look after Boswell, who was still unconscious.

Just then, eight more fighters jumped us—this time twin-engined Me-110's. I could imagine them gloating over the Iron Crosses they'd receive after knocking us down. They flew closer than I thought possible, barely missing us as they pulled up. Two of them went below our plane—and Sgt. Joe Moloney, the belly gunner, sent them spinning down in flaming coffins. Then they changed tactics, shifting to the right side and flying into our broadside.

It was up to the co-pilot then. As each fighter got into position for the attack, Bill kicked the rudder and skidded in his direction, throwing the fighter off his aim. But they got plenty of hits. I sat there helplessly, watching them blow the plane to pieces. The trailing edge of one wing had already been torn away.

Another fighter started in—and disintegrated right at our wingtip. Harold Smith, the engineer, had given him a full blast from his turret.

I didn't think we could last much longer. Pieces of the plane were beginning to fall off.

As the fighters swept in toward us, the leading edges of their wings lit up like neon signs as their guns roared.

Then, ahead of us, I caught sight of a lake. The top turret gun rattled over my head, and I looked up to see an Me-110's blow up in a flash of light. Smitty had hit him—but good. The lake came closer each minute.

I was certain it was Switzerland because the Nazi fighters turned back. Bill had done a beautiful job of evasive action.

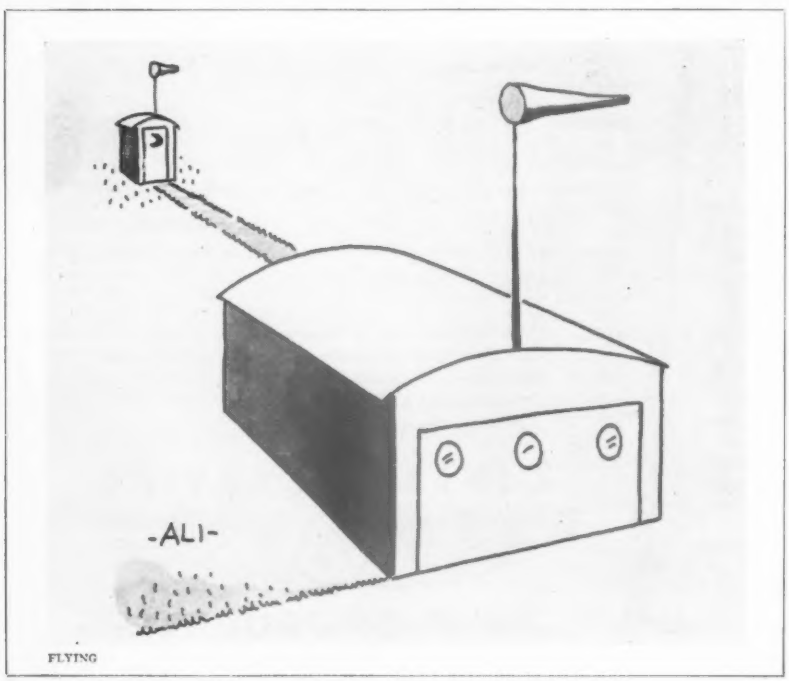
"Let me crawl in your seat, Bill," I said. "I'll see if I can find someplace to put this wreck down." We switched seats, and I settled behind the co-pilot's controls. There wasn't a patch of cleared ground in sight.

"I'm going to try to set her down in the lake, Bill."

I could see the surprise on his face. He was scared. So was I. B-17's weren't built for water landings.

Since Boswell was still unconscious, I sent Smith down to help Morry carry him to the rear of the plane. And I sent word to the rest of the crew to get ready for ditching.

I spotted a large town on one end of the lake (later discovered it was German) but fortunately decided to land near some boats near the far shore. We were traveling at terrific speed. The throttles were jammed in wide-open position. Wing controls were shot-up so



FLYING

badly that we couldn't turn—so I just headed her straight ahead with the nose pointed at the surface.

I levelled out about 20 feet above the water—and we floated along for over a mile, about six feet in the air. Sweat had popped out on Bill's face. "Good luck, fellow," I called.

He grinned. "You can do it!" And he patted me on the shoulder, just as the tail hit. We bounced once, twice, three times—and then we stopped. My safety belt popped, and I dove out the window into the lake.

The surface of the water was oily as I fought my way toward the air. My heavy flying boots, filling with water, began to drag me downward, and the sinking plane was creating an undertow.

With a desperate lunge, I caught my fingers on the edge of a hole in the wing, and pulled myself up. The rest of the crew had climbed out the radio-room hatch, and they were ripping the twisted life-raft releases.

"Hurry up," I yelled. "She's going down fast. Let's get away from this damned thing before we go down with her!"

Carrying Boswell, we piled into the rafts and paddled away. *Raunchy*, the B-17 we had named so proudly only a few months before, was a wreck. She was riddled with holes big enough to crawl through. The fuselage was broken in half, and the rudder had been shot away to nothing.

"Gawd-amighty, Skipper," exclaimed DeWitt Weir, the tail-gunner. "How'd we ever get out of that mess?" Just then the plane slid beneath the oily surface. It was like losing one of the crew. She had taken us through 16 raids over Europe. And now she was dying.

When the small boats finally got to us, we piled into them and fell to the deck, exhausted. But I felt that something was wrong. Someone was missing. I counted the crew, and discovered that Sergeant Moloney, our belly gunner, wasn't with us.

"Where's Joe?" I asked.

Someone told me. When they opened Joe's hatch door, they found him dead. They closed the hatch and left him with *Raunchy*, and the two of them went down together. I believe we all had tears in our eyes. I had never had anyone so close to me die before. It was a great shock.

The boatmen either couldn't understand us, or they just didn't want to talk. But presently a launch came toward us. My tail gunner leaned over toward me and pressed his 45-automatic into my hand. "I figure you'd better have this," he said, "just in case . . ."

I counted the men in the launch—five of them. Counting the two in the boat with us, that made seven. There were seven shots in the automatic. I intended to make good use of the bullets if the men turned out to be Germans.

Just then, the launch broke out the Swiss flag.

As I climbed into the launch, I noticed my shirt was sticky with blood. I hadn't realized I was wounded. I reached into my pocket for a cigarette,

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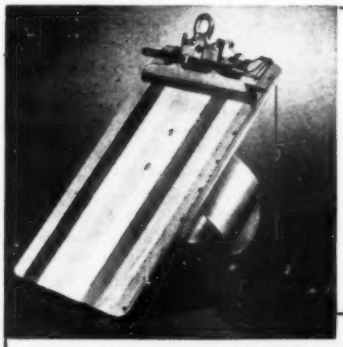

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but they were soggy. "Here, Sam, have one of mine," said Bill.

My hand was shaking and I could hardly light the match. I took a deep drag and settled back into the seat. All the crew were sitting quietly, except the still-unconscious Boswell, who whimpered slightly. Morry Weinberg had given him some morphine shots to ease the pain. Everyone was covered with blood. Sgt. Carter Thornton had the back of his head blown open—and his hair was a mat of dried blood.

I wondered what the future held.

We were taken to a doctor immediately, and Boswell was sent to a hospital. That was the last we were to see him for five months. We learned later that he lost his left eye. The entire crew was interrogated—but we told them only our names, rank, and serial numbers. At 3 o'clock that afternoon the police officials put us on a train for Dubendorf, where we remained for two days of additional questioning. Again, we clammed up, didn't tell anything, even though they were Swiss and not German authorities.

Almost a month later, October 4, 1943, we were becoming accustomed to a life of internment at Bienne, Switzerland. That morning, after calisthenics, Bill Freund and I met Morry on the stairs.

"Two more came in today," he said.

"Two more what?"

"Planes . . . *airplanes*," he said with mock condescension. "They came from Africa—and really got the hell shot out of 'em."

"Any of them killed?" I asked.

"Thirteen!"

"Lord!' I exclaimed. "They really got it."

Morry then told us that, according to news from Bern, they were going to bury them the next day in an English cemetery in eastern Switzerland.

About 10 o'clock that morning, Lieutenant Furi, the Swiss Commandant, called me into his office. I was a little worried about the visit because he managed to make life miserable for us. He turned to me without formality and said:

"Your gunner has been removed from the Boden See and will be buried with the other Americans tomorrow."

Then he turned away, indicating I was to leave his office.

The next morning we were routed out of bed at 5:30 and boarded a Funicular for the trip down to the valley. We each wore a large, black band around the arms of our makeshift uniforms.

We arrived at Bad-Ragaz before noon. At noon, all the church bells in the little village began to toll for the 14 American boys who were being buried that afternoon.

We filed into the little English church, built in the 17th century, and remained standing until the Military Attache and his party were seated. The crew stood there, some with tears in their eyes, looking at the long wooden boxes on each side of the uplifted pulpit. Each casket was covered with an American flag, and flowers stood at the foot of each.

When the services were over, the pallbearers moved forward to carry the caskets outside. My crew was to carry the remains of Sergeant Moloney. His casket was carried at the head of the procession. He had been the first American aviator to die in Switzerland.

The music, played by a Swiss military band, was slow and mournful. Both sides of the street were lined as we moved toward the cemetery. Many of the women were weeping and each man stood at rigid attention and doffed his hat as we passed. The cemetery was a mile from the church, through twisting village streets.

The priest moved to the edge of the single grave and blessed the ground into which the American airmen were to be placed. After the last casket had been placed in the grave, the priest again stepped forward. He stooped and picked up a handful of dirt, and with this bit of earth in his hand he began speaking.

"Ashes to ashes, dust to dust . . ." A lump came into my throat as his quiet voice continued. ". . . in sure and certain hope of the resurrection to eternal life . . ."

Days at the internment camp drifted by. The food was rotten, by American standards: cheese, tripe, black bread and wine. We didn't like it but there was nothing we could do.

On November 1, we were moved from Bienne to Berner Oberland, a ski resort in a section of mountains in Central Switzerland. It was a much better location and we had more freedom. The village, Adelboden, had a permanent population of 350 though the winter vacation population swelled to about 10,000. Food was better and our new quarters even contained bathtubs.

After the snow began to fall we were allowed to ski each afternoon, and life began to be rather pleasant. President Roosevelt had announced at Thanksgiving that "Every fighting man will have turkey for Thanksgiving, no matter where he is . . ." We were no exception.

December was cold, and the snow came thicker and faster. At Christmas, everything was covered with glistening snow and the countryside looked like a picture postcard. We got together a few days before the holiday and decided to do something constructive. We planned a party for the children of neighboring villages. Some of them, believe it or not, had never had a Christmas celebration before.

We decorated the hotel lobby with makeshift colorful ornaments, and placed an enormous tree at one end. One of our guards volunteered to act as Santa Claus. A stout fellow wouldn't do, for the Swiss Kris Kringle is *thin*. (According to legend, he is supposed to be thin from hunger, and it is customary to have food waiting for him when he arrives on Christmas morning). "Santa Claus" was an old man who just fit the description, even though countless cigars had made his beard slightly dingy.

The biggest break was securing movies of "Snow White and the Seven Dwarfs" in the German version. Luckily, the films fit the only projection machine we could get.

Several days before the party, we received another surprise. A letter arrived from the Vatican City. It had been written by Pope Pius himself and wished us a Merry Christmas. Enclosed was a check for 400 francs. We decided we couldn't use the money for a better purpose than the Christmas Party, so we added it to the fund.

Hours before the party was to start dozens of freshly-scrubbed youngsters were shoving and pushing over the yard in front of the hotel. As they entered the door we gave each a bag filled with fruits, candies and nuts (everything non-rationed that we could collect). Their eyes shone as they explored the bags.

The little girls wore pigtails and the boys, for the most part, had their heads shaved. It was apparent they were wearing their "Sunday best," although the clothes were very plain. Most of the Swiss are very poor and the clothes were probably hand-me-downs—for they are a thrifty people.

I'll never forget the looks on the youngsters' faces when we started the moving pictures. Few had seen a movie before and they actually could not believe what they saw. The room was completely silent except for gasps of amazement.

Between reels, the teachers explained how "people" got up on the walls and moved—and then, with sighs of relief, the kids really began to enjoy the show.

After the film was over, Santa Claus came out and was greeted with wild elation. And later, the Swiss youngsters sang Christmas carols for us, in German, of course. Sung in a foreign language, thousands of miles from home, they still brought poignant memories to every one of the internees.

The youngsters enjoyed the party, I know. But we enjoyed it more.

That was Christmas in Switzerland in 1943. END

"And There I Was . . ."

THE MISSING PHONE BOOK

Back in 1942 two friends of mine went on their first night cross-country flight. On their way from Chicago to Cleveland they ran into snow squalls.

Neither pilot had been to Cleveland before, but they decided the best plan of action was to remain on course and fly the "gauges." Radio reception was impossible so they computed their ETA at Cleveland, and finally broke out over welcome city lights and the airport.

After landing, they decided to remain overnight in a hotel. A search through the telephone booths revealed a definite lack of Cleveland phone books. Turning to the information clerk, one of them asked, "Why don't you have any Cleveland phone books around here?"

The clerk snapped back, "What for? This is Akron, bud!"

C. V. GLINES

Britain's Warplanes

(*Continued from page* 33)

same position as the U.S., with a number of experimental prototypes flying but no substantial production. If jet bombers are considered, the United States would have a clear edge since Britain so far has announced only the English Electric *Canberra I*, whereas the U.S. has eight or nine types flying, one of which (B-45) is operational and another (B-47) is in limited production.

Nevertheless, even the *Canberra* made U.S. military men's eyes bug out with its display of maneuverability. It had a flight range of from over 500 m.p.h. to less than 100 m.p.h. and seemed to be under full control at the lower speed. Powered with two powerful Rolls-Royce *Avon* axial-flow jet engines, the *Canberra* demonstrated a remarkable rate of climb. Pilot R. P. Beaumont put it through a series of slow rolls and high speed turns. The *Canberra* is a light bomber such as could be used effectively for low altitude work and ground support, though it was originally designed for radar bombing at high altitude. It is 64 feet long, has a wing span of 65 ft. 6 in., and a height of 15 ft. 7 in.

At Farnborough, Great Britain released from its secret list for the first time three new jet fighters—the de Havilland *113* and *112* (*Venom*) and the *Avro 707*, which has since crashed.

The *Venom* has been developed from the de Havilland *Vampire*, and bears a resemblance to that plane as can be seen from the photograph on page 33. It has been redesigned completely to take the more powerful de Havilland *Ghost* turbojet engine of 5,000-lb.-plus static thrust. The *Venom* has a new thin wing section and a larger fuselage nacelle. It is expected to replace the *Vampire* for squadron service in 1950.

The de Havilland *113* is a conversion of the standard *Vampire* for night fighting. It is a two-seater and carries a heavy load of radar in the nose. Quarters in the *Vampire* were so tight the seats had to be staggered. The *113* is powered by the 3,500-lb. thrust *Goblin* turbojet engine. No orders have been placed for the *113* so far.

The Avro *707*, which crashed early in October, was a delta-winged research plane flown for the first time before the show opened by Chief Test Pilot Eric Esler. The *707* was exhibited statically at the show and did not fly there. It had a span of 33 feet and a length of 30 ft. 6 in. It was powered by a Rolls-Royce *Derwent* of 3,500-pounds static thrust. It appeared to be very fast and seemed to need a lot of runway. More powerful engine installations for the *707* were planned.

Other new fighters which flew at the show were the Hawker *P. 1052* (see cover), the Vickers-Supermarine *Type 510*, the Meteor *8* and the *Python Wyvern*.

The *1052* has swept wings and is powered by a Rolls-Royce *Nene*. It is one of Britain's fastest aircraft and last May set a London-to-Paris speed record by flying the 221 miles in 21 min. 8 sec.

The *Meteor 8* is a cleaned up production version of the *Meteor* which first chased flying bombs over England in 1944.

Progressive development has made the plane a tremendously versatile fighter which has not yet exhausted its design potentialities. The *8* has a redesigned rear fuselage with a new shape fin and rudder. It will shortly go into large scale production to replace the *Meteor Mark 4* as a front line squadron service fighter. The *Meteor* is powered by two Rolls-Royce *Derwent* 5 turbojets giving total maximum thrust of over 7,000 pounds.

Two *Meteors* at the show were powered with the powerful new Rolls-Royce *Avon* axial flow engines which reportedly have a static thrust of 7,500 pounds. The *Avon Meteor* appears to use the old-type tail assembly but the nose is lengthened and so are the turbo nacelles. It must be by far the most heavily powered fighter in the world with its reported 15,000 pounds of thrust. That is nearly three times the thrust of the fastest fighter in the U.S., the North American *Sabre* (F-86).

The Type 510 descends from the Supermarine *Attacker* which is a straight-winged production Naval fighter. The 510 is a swept-wing version, also powered with the latest 5,000-lb. thrust *Nene* engine. It has a cleaned-up pointed nose, but still retains the tail-wheel undercarriage. It has a sea level speed in excess of 670 m.p.h., and flew over 660 m.p.h. at the Farnborough show.

The Westland *Python-Wyvern T.F.2* torpedo fighter resembles the *T.F.1*, which has a Rolls-Royce *Eagle* piston engine. Instead of the *Eagle*, however, it is powered by an Armstrong Siddeley *Python* axial-flow turboprop engine using a counter-rotating propeller of large diameter. The six propeller blades (two sets of three) deliver 3,670 h.p. in addition to which bifurcated jet pipes in the tail give a thrust of 1,150 pounds.

Sixteen different engines were shown in stands at Farnborough, and seven more types were installed in aircraft. Turbojets included the de Havilland *Ghost* and *Goblin*, and the Rolls-Royce *Nene*, *Avon* and *Derwent*. Turboprop engines shown were the Armstrong Siddeley *Mamba*, *Double-Mamba*, and *Python*; the Bristol *Proteus* and *Theseus*; Napier *Naiad*, and Rolls-Royce *Dart*. These turboprop engines vary up to over 4,000 horsepower.

The SBAC program included for the first time a demonstration of after-burning (British call it "re-heat"). Two fighters, a *Vampire* and *Meteor IV*, gave a flying exhibition of the gain resulting from the use of after-burning. The British have been researching this problem for more than five years and a *Meteor* was flying with an after-burner as early as 1944.

Equally as interesting to American observers as the military planes were the large number of experimental new jet and turbo-prop transports which threaten to overcome American leadership in the airliner field. This subject will be covered in an early issue of FLYING. END

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  Note: An axle adapter arrangement and universal rigging permits interchangeability on various aeroplanes within the gross capacity of each ski model.

- **Tricycle Gear Types.** Standard models for Ercoupe. Custom-built models for Navion and others.

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That 'New Look'

(*Continued from page 27*)

coatings of dope and paint used to protect it and give it the necessary tightness and strength.

The degree of maintenance accorded the paint and dope coatings will determine fabric life. When the coatings begin to peel or check, when "ringworms" begin to form on the doped surfaces, or when the coatings have been scraped away by mechanical abrasion, the underlying fabric is left unprotected. Subsequent molding caused by moisture, fungus or chemical attack, will lead to rapid deterioration and eventually to an expensive recovering job.

The initial action in the preservation of fabric coverings is to keep them clean. Methods used and the frequency of cleaning depend a great deal on how often the airplane is used, where it is parked, the type of dirt involved, and prevailing atmospheric conditions.

Under normal conditions, an airplane in daily use should have all fabric surfaces washed clean at least once every two weeks. An ample supply of warm water and suds whipped up from a castile-type soap should be used. Alkali-type soaps should be avoided, as all alkalis are very injurious to the dope. After washing, all surfaces should be rinsed with a cold water spray.

Airplanes based near salt water and flown daily should be washed down with a cold water spray at least once each week to remove the microscopic salt crystals which condense on the surfaces from the salt-laden atmosphere. All chlorides (and salt is a strong chloride) are extremely harmful to doped surfaces.

Occasionally, due to a leaky oil tank, oil line, or spillage, portions of the fabric will become covered with oil. Such areas should be cleaned immediately. With due regard to the fire hazard involved use a clean rag saturated with unleaded gasoline. Swab the oily area gently—never rub briskly as the friction may produce sparks which could ignite the gasoline. Follow by washing the swabbed area with warm water and soap suds, then with a cold water rinse. Tar on the fabric picked up from asphalt runways may be removed the same way.

When the dope on any fabric-covered surface has begun to peel or crack, the only remedy is to sand away the old coating and apply a new. Use a fine grade of sand paper, and sand only enough to remove the defective dope. Apply three or four coats of clear dope to the sanded area, allowing each coat to dry thoroughly before application of the next. Use a finish coat of dope pigmented to match surrounding surfaces.

It may be noted that the dope seems to be in good condition but that the fabric has lost its tautness. When thumped with the finger, the dull, bass-drum sound is missing. This calls for a rejuvenation job. Clean the surface thoroughly and allow to dry. Then spray a light application of dope thinner on the area to be treated. Follow this immediately with a coating of dope pigmented to blend with surrounding surfaces. In most cases this treatment will restore the fabric's original tautness.

For those who desire to use them, there are commercial dope rejuvenators available. Instructions for their use are furnished by the manufacturer.

Many pilot-owners are prone to disregard the metal parts of their airplane. This pertains to the airframe structure as well as to the skin sections of all-metal lightplanes. When a part rusts or corrodes to any great extent, or becomes slightly cracked, its strength at full service loads becomes a doubtful factor.

Atmospheric moisture is highly corrosive to most aircraft metals and few machines are thrown into more direct contact with moisture than the average airplane. When an airplane descends from the relative coolness of altitude to warmer lower air levels, moisture condenses rapidly on the cooled metallic surfaces. It may dry rapidly but the atmospheric chemicals it contains remain on the metal to cause oxidation and other types of chemical reactions.

During inspection of the airplane, the pilot should note all metallic areas that have started to corrode and all areas where paint deterioration predicts corrosion, and mark them for early attention. When caught at an early stage, simple cleaning and touch-up will usually correct the condition.

When steel or iron parts have started to rust, sand the area to bright metal, clean with solvent, then coat immediately with zinc chromate primer. Corroding aluminum, either in the form of sheet, tubing, or castings, requires a bit more care. First, sand the area lightly—just enough to remove the corroded material. Next, swab the sanded area with a 5 to 10 per cent solution of chromic acid in water. This solution cleans and passivates the metal and prevents immediate surface oxidation. If the part or area was previously painted, follow with a coat of zinc chromate primer, then a coat of aircraft enamel to match the surrounding color. Never re-finish aluminum without first removing all products of corrosion, as the corrosive chemicals trapped under the paint film will continue their attack.

Another thing to watch for is small scratches or nicks in highly stressed metal parts. When discovered, they should be sanded out immediately, leaving a shallow, rounded depression. If the scratch or nick is very deep, it should be called to the attention of a licensed mechanic. Such injuries, though they may appear superficial, create what engineers term "stress concentrations," and may cause sudden failure of the part when operating under a heavy load.

Propellers, and especially wood propellers, should receive close attention every time the airplane is inspected. Make certain that the varnish coating is in good condition and that it has not worn off the leading edge. Frequently small pebbles kicked up during landing or take-off will dent the blades just enough to puncture it. Moisture entering through this puncture may affect the glued laminated structure. Such spots should be touched up at once. If the propeller becomes exceptionally rough or the finish badly deteriorated, it should be overhauled and rebalanced immediately. Of course, propeller overhaul is a job for a licensed mechanic but it is up to the pilot-owner to determine when such overhaul is necessary.

A coating of good automobile polish will do much to preserve propeller finish, and will protect the wood when flying through the rain. Apply this polish at frequent intervals, rubbing briskly to attain a smooth, hard finish.

Metal propellers must be inspected carefully for small nicks and surface scratches which may become points of stress concentration. When such a nick or dent is discovered it should be called to the attention of a licensed mechanic. A very minor injury may be sanded out without destroying propeller balance; larger injuries should be repaired while the propeller is mounted on a test stand.

Propeller track should be checked occasionally. This is easily accomplished by thrusting a stick into the ground so that the protruding end just touches the tip of one blade. When the other blade

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is turned into position, it should not be more than ⅛-inch out of track.

Metal cowling and metal inspection hole covers have a tendency to work loose in time. This looseness not only causes unnecessary noise but abrasion caused by rubbing of the loosened part may destroy surface finishes and cause corrosion.

Batteries must come in for their share of attention. When batteries are allowed to stand for an extended period in a discharged condition, the normal sulphation that is present on the plates will harden, thus affecting battery capacity. The battery should be kept fully charged at all times. When re-charging, see that a low charging rate is used. Rapid charging tends to dislodge active material from the battery plates, which in turn reduces battery capacity and life.

Keep battery electrolyte at the correct level. Use only distilled water when replenishment is necessary. The battery and battery terminals may be kept clean by occasional washing with a strong solution of baking soda in water. Petroleum jelly applied to the battery posts and cable terminal will help prevent corrosion of the cable ends.

A blow-out during landing has caused more than one pilot a jittery few seconds ending up in an expensive repair bill and sometimes in a hospital. Don't trust your eye to judge tire inflation. Check them with a tire gauge. Under-inflation will shorten the life of any tire and may lead to sidewall breaks with a resultant blow-out.

A good grade of tire paint applied every few months will keep tire surface rubber from air-checking and oxidizing. It is also important to keep tires free of grease and oil. Use a solvent-saturated rag to clean away these oils. Never park the airplane so that the tires will be resting on grease-soaked turf or hangar floor.

One factor often overlooked by lightplane owners is proper cabin maintenance. Dust is allowed to accumulate in the fabric seat covers and upholstering. Oil and grease blotches and stains are ignored. The instrument board paneling is allowed to become dull and drab in appearance. Scratches and mars on cabin woodwork and metalwork go unnoticed. The floor mat is soon worn and shredded by constant scuffing of grit and gravel.

None of these factors are "dangerous" in that they may cause an accident. At the same time, they are the trademark of the careless pilot—of the lightplane owner who permits other portions of his airplane to go to pot before taking action. A bit of paint here and there, a vacuum cleaner to remove fabric dust, a solvent to remove oil and grease stains, some metal and furniture polish, and a bit of elbow grease judiciously and vigorously applied can keep any airplane cabin in tip-top shape. END

Weatherman

(*Continued from page* 18)

passes well to the north of the observer, the warm front may pass the observer on the ground, leaving him temporarily in the warm sector accompanied by a noticeable increase in temperature. In the warm sector of the cyclone, the precipitation diminishes although considerable altostratus or cumulus may persist. Cumulus in the warm, moist sector of the cyclone is especially noticeable in summer and when well developed may result in showers and thunderstorms well in advance of the arrival of the cold front.

With the passage of the cold front in this instance, the same showery type of precipitation is characteristic, although the decrease in temperature is more marked due to the greater contrast between the air in the warm sector immediately preceding the cold front and the much cooler air following behind the cold front. Some time after the passage of the cold front the clouds begin to break up into the stratocumulus type and the rain or snow showers diminish rapidly. The stratocumulus clouds are relatively low, white or gray clouds ranging from patches to completely cloudy. Even when completely covering the sky, thin spots occur which appear light in contrast to the heavier portions of the cloud.

One hundred to 200 miles behind the cold front, the only clouds usually occurring are the small white, fluffy cumulus of fair weather which exist in isolated patches. As the cold front moves farther away these cumulus begin to dissipate and clear, cool weather prevails.

During the approach of the low pressure area, the barometer on the ground indicates falling pressure as the weather conditions deteriorate and rising pressure as the low recedes and the weather improves. The disadvantage of the barometer as the sole forecasting aid lies in the fact that the weather depends on the moisture and temperature distributions that exist in the atmosphere and not merely on the air pressure.

Numerous cases are observed where the barometer indicates approaching lower pressure, yet the presence of insufficient moisture causes few clouds and little, if any, weather. The barometer is also of little use to the pilot in flight since changes in altitude may cause much larger variations in the barometric reading than any related to moving high or low pressure areas. Hence, the importance of cloud observations in making reliable forecasts.

In the latitudes of North America and Canada, low pressure systems generally move from west to east at the rate of about 400 to 500 miles a day in winter and slightly slower in summer. The most frequent path of the low pressure areas across the North American continent is approximately along the border between Canada and the United States, although many move farther south, particularly in winter, and some take a more northerly path, especially in summer. Most cyclones move across the North American continent from the Pacific coast to the Atlantic coast in four to five days. Following each moving low pressure system is an area of higher pressure with its asso-

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ciated improving weather. This sequence of low and high pressure patterns is repeated on an average of once every three days with varying intensity and accounts for the changing weather pattern normally observed.

Having discussed the relation of surface winds to the prevailing pressure system and the normal sequence of weather changes as related to cloud formations, it is now possible to formulate general rules by which the observer may locate himself with respect to the controlling features of the weather situation and thus estimate the changes which are likely to occur. A suggested forecasting procedure is outlined below:

1. Observe the surface wind direction. Chimney smoke, blowing flags, etc., are helpful in this respect. If the location is influenced by local terrain effects such as hills, the direction of motion of any low clouds will often give a more accurate picture than the surface wind. If the observer has a compass, he simply faces the wind and determines this direction by reference to North on the compass.

2. Determine the direction of the nearest low pressure area. This will always be directly to the observer's left if he stands with his back to the wind.

3. Determine position with respect to low pressure center. By recalling the picture of the typical cyclone with south winds to the east of the low pressure center, north winds to the west of the center, etc., the observer is able to determine whether his location is under the influence of a low pressure system approaching from the west with subsequent deteriorating weather conditions or under the influence of a storm center receding to the east with subsequent improving conditions.

4. Observe the entire sky.

5. Select the predominant, fundamental cloud type which most nearly describes the sky condition. Assume the sky is clear if less than one quarter is covered by clouds.

6. Compare the selected cloud type and its relation to the typical cyclone with the orientation determined from the surface wind observation. This will provide a further check on the observer's position with respect to the weather situation dominating his area.

7. Check the predominant cloud type carefully for its vertical extent. Flat clouds in several sheets are characteristic of the gently rising air currents flowing along warm front surfaces. Isolated clouds rising to great heights indicate the stronger upward air currents more often associated with cold front action. Since the vertical thickness of the clouds depends on the strength of the upward air currents, the pilot is readily able to determine the degree of turbulence or bumpiness of the air from his ground observation. Cold fronts and their associated cloud systems usually produce the roughest flying conditions.

8. From the cloud type (flat and in sheets or thick with billowy tops), determine whether a warm front or a cold front is influencing the area.

9. If under the influence of a warm front check position in the sequence of cirrus to altocumulus to altostratus to nimbus and then forecast remaining portion of sequence (warm front to cold front to clear.)

10. If under the influence of a cold front, check wind direction. If wind is still west to southwest forecast no improvement in weather until wind shifts to northwest. If wind is northwest (cold front already passed) forecast steady improvement.

11. For rough timing of weather events use average movement for low pressure areas of 400 to 500 miles a day. If cirrus (600 to 800 miles ahead of low) is observed, forecast deteriorating weather latter part of 24 hour period. If altostratus (200 to 400 miles ahead of low) is observed, forecast deteriorating weather or little change and then improvement at end of 24 hour period.

12. Temperatures will often aid in distinguishing important weather developments. Sudden increases in temperature are indicative of entering the warm sector of the cyclone. Sudden decreases in temperature indicate the passage of the cold front. The latter is particularly noticeable in the cold waves typical of the Middle West in winter.

13. Learn to follow the sequence of weather changes, hour by hour, if necessary. Keep the forecast up to date by modifying it as the weather changes.

14. The errors in forecasting are usually made in estimating rates of movement. These errors can be minimized by a careful check of the sequence of cloud formations and a consequent modification of the forecast.

15. To find improving conditions when flying in bad weather, fly across the surface wind toward higher pressure (to the right when flying downwind).

16. The key to good weather forecasting for the trained or untrained weatherman is experience. Attempt a few forecasts and observe the weather that actually occurs.

17. Remember that the weather is tricky. The best rule is to stay out of bad weather areas. Whenever possible augment your forecast with the advice of a professional weatherman when planning a long distance flight.

The following examples illustrate the application of the procedure outlined above.

EXAMPLE No. 1. Assume the pilot to be over Louisville enroute to Akron but some two hours flying time away. On the radio he hears that the weather at the Akron airport is overcast, ceiling 1,000 feet, surface wind east 10 and no precipitation. From the low ceiling under the clouds he decides that the cloud type at Akron must be cumulus, nimbus or stratocumulus (other cloud types have higher bases). Nimbus can be ruled out since there is no precipitation. The predominant cloud type is probably not cumulus since the sky is reported as overcast without the breaks in the cloudiness typical of cumulus clouds. Stratocumulus is therefore the logical deduction. From the surface wind direction the pilot decides that the low pressure center is to the south of Akron and from the low cloud base, probably only 100 or 200 miles to the south. The stratocumulus cloud type also checks this position. With the low pressure center so close and not to the east of Akron (otherwise the wind would be from the northeast) there is little chance that conditions will improve by the estimated arrival time and the pilot should look for an alternate airport. From the normal movement of the low pressure system to the east and the improving conditions in the higher pressure to the west, a possible change of course would be toward northwest Ohio or northeast Indiana

NEW CHUTES

DESCRIPTIONS of new military parachutes sometimes sound like something out of Vogue. Two of the newest are the "split skirt" and the "extended skirt" 'chutes.

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The "extended skirt" parachute (top) doesn't have anything to do with the New Look. It will soon become standard equipment for Navy jet pilots and other high-speed plane personnel. It gives stability when pilots bail out, and doesn't swing back and forth when they approach the ground.

The "split skirt" parachute (commonly known as the "Derry" 'chute) is used by Air Force para-rescue troopers. The split enables additional maneuverability when the paratrooper reaches tree-top level.

where the pilot should be able to land and await the slowly improving conditions at Akron. To confirm his forecast he would tune his radio to stations in the sector where improved weather is expected (airports in northwest Ohio and northeast Indiana).

EXAMPLE No. 2. Suppose the pilot is flying over Des Moines, heading eastward, and observes smoke plumes near the ground blowing from the northwest, indicating a northwest surface wind. Although the sky is clear, with only a few fluffy cumulus clouds, as he travels to the east these cumulus increase until the sky is three quarters covered. From the observation of the northwest wind, he realizes that the low pressure center is to the northeast of him, and that he is flying in the cold sector of the cyclone. This is confirmed by the cumulus cloud type and their increase tells him that the cold front is ahead of him to the east. Keeping a careful eye on the vertical thickness of the cumulus clouds (to show the strength of the upward air currents), he finally decides that the weather ahead will become too rough for flying (the clouds are building up to great heights). At this point he should land and wait until the cold front has moved farther east. By listening to weather reports on his radio from airports to the east he can estimate the rate of movement of the cold front and adjust his flight plan accordingly.

EXAMPLE No. 3. Suppose the pilot is considering a Saturday afternoon of local flying. Friday noon he observes cirrus clouds, a few altocumulus and a surface wind from the southwest. He recognizes these as the first cloud formations produced by the sloping warm front surface of an approaching low pressure area with the center of the low to the northwest of his location. From the cloud types (cirrus, few altocumulus) he judges that the storm area is still some 500 to 700 miles away but a normal rate of movement of 400 to 500 miles a day could bring the storm area close enough to his location to spoil his Saturday afternoon flying. On the way home from the office Friday evening, the outlook continues pessimistic as the altocumulus has increased, thickened, and altostratus is appearing as the wind continues from the southwest. One last check late in the evening while putting the cat out for the night reveals the wind still from the southwest although dying down but the expected thickening of the altostratus has not materialized and only patches of clouds are visible. Revising his forecast, the pilot judges that the normal sequence has been interrupted, probably due to the storm area swinging far northward or decreasing in intensity and concludes that Saturday's flying conditions will be favorable after all.

The Weather Guide is a recently developed weather forecasting instrument which embodies the preceding principles. It is compact, of convenient size, and enables its user to make his own personal weather forecast for the coming 24-hour period. As in the previous discussion the meteorological variables used in making the forecast are observations of the current cloud formations in the sky and the surface wind. Illustrations of the six fundamental cloud types are included on the instrument. Along the left edge of each sky picture appear eight surface wind directions. By turning a knurled knob at the bottom of the instrument, an arrow appearing in the slot to the left of the sky pictures can be moved to select the sky conditions and surface wind direction best matching the currently observed weather. This setting causes a concealed belt within the instrument to reveal the appropriate one of 112 forecasts printed on it in the forecast window at the top of the Weather Guide.

Each instrument includes separate weather forecasts for the summer and winter seasons on the same belt. Different forecast belts are used in each of several climatic zones in the United States and southern Canada although all Weather Guides will perform with good accuracy in any part of the northern hemisphere.

The fundamental basis upon which the Weather Guide was developed is the principle that similar weather situations tend to produce the same weather each time they recur. This principle has long been used by meteorologists in preparing forecasts by searching for previous similar weather maps or by recalling similar weather situations from their own experience. The surface wind direction and the moisture distribution throughout the atmosphere as revealed by the cloud formations describe the weather situation sufficiently well to prepare a reliable 24-hour forecast from this concept.

In building this feature into the Weather Guide, it remained then to prepare a tabulation of the weather which actually occurred in any 24-hour period following the occurrence of all possible combinations of cloud and wind shown on the instrument. This was done by selecting key stations in each of the 11 climatic zones for which Weather Guides were to be constructed and tabulating the daily weather which occurred at these stations for some 50 years of record. The forecasts for each setting were then obtained from a statistical evaluation of these tabulations. This lifts the Weather Guide from the realm of theory to a realistic and practical device for providing estimates of 24-hour weather changes.

The forecast given by the Guide may be continually extended and adjusted by resetting the indicator with each significant change in sky condition or wind direction. The use of the Weather Guide serves as a constant reminder of the fundamental relationships in weather. It gives any pilot, especially the student, a painless indoctrination in weather, heretofore a relatively unknown quantity to most persons.

Wherever you obtain weather information, be it from these simple forecasting rules, from the Weather Guide or from the professional expert, study the weather and follow the changes from day to day. Decide for yourself the significance and cause of the changes you observe. Soon you will find yourself an expert in probably the most important subject a pilot should know. END

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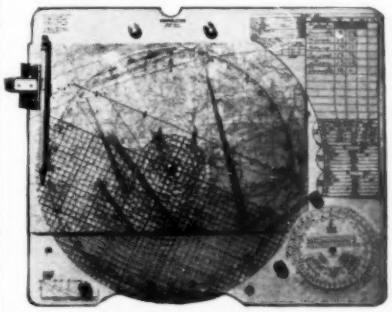

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Dilemma

(*Continued from page* 25)

go limp like the best man at a society wedding and everyone seemed to like how the cane did, so that's the way the engineers solved the problem of the ladder. It has lots of joints, in fact it has more joints than the First Ward, and the idea seems to be that the passengers will get so interested trying to put the joints together so that the ladder will be stiff that they won't notice that their rear ends have begun to smoke, giving the place something of the appearance of a rumba palace.

When they do finally get the ladder together, and it looks like a mundane ladder to some and rather like Jacob's kind to the others, I suspect, they try to get it around the passageway to the unloading door which requires that they unjoint it again which they proceed to do with *eclat*, as we college persons put it. And then they joint it up again while holding it out the door, and that is a feet—in fact it is ten feet, and the ladder is heavy, and so on. This sounds like it takes quite a while to do, but when you are enthusiastic the time seems to pass very quickly. The maneuver is mighty nice to watch if someone else is doing the job as a sort of demonstration, and there is no fire.

Some of us pilots got some of the engineers—they were just ordinary engineers and could speak English pretty good—well, we got them to demonstrate to us how to use the ladder. While they held pieces of the ladder out the door trying to put the joints together, they dropped it three times. But that didn't matter for there were men on the ground to shove the pieces back up inside again and when I asked one of the engineers if he planned to carry a ladder crew slung under the airliners in hammocks, he got kind of sore.

Finally, though, they got all the joints together and put the ladder out the door and the first engineer stepped on to the rungs and that is when I realized the genius of the engineer at the factory who had thought up the ladder, because it went limp just like that magician's cane. The engineer who was going down the ladder darn near broke his contract. We pilots wanted to cheer him up, as you can well imagine, so we all laughed right heartily but he didn't get very cheerful, I am sorry to say.

We pilots wanted to get some of our favorite officials to demonstrate the use of the ladders to us so we would be well grounded in the subject, so to speak, but they got wind of the thing, if wind is the right word, and it seemed that they felt that the best interest of the stockholders, or at least the officials, demanded that they keep in good physical condition so they declined to make any demonstrations. Instead they told the junior officials to put down their stenos and start to work on a solution. And that is how we got the chutes, which are lots more fun if anything could be.

Now, don't get me wrong. These chutes are not the kind of chute that you might think right off. The cabins are pretty high but even the engineers did not plan, at least for any length of time, in putting parachutes on the passengers and have them make what are called free jumps, which are about the only free things that are left. No, this is an entirely different kind of chute. I don't know where the engineers got the idea for this one but it may have been that the author of *South Pacific* told them about the first time that a girl stepped onto Guadalcanal. The effect is somewhat similar, from an artistic point of view.

Here is how this chute works, using the word in the engineering or loose sense. The scene opens as before, your airplane is on the ground but not on the belly and you are either on fire or, if that is not the case, you act as though there might be a fire, as you certainly must act. A stewardess goes to the cloak room and comes out with a knotted rope and opens the passenger loading door. There is a hook on the doorsill and she hooks one end of the knotted rope on the hook and throws the other line overboard like you do when you are fishing. Then she goes to the cloak room again and comes out with a big bag that has rolled up in it a long piece of cloth, an oblong piece, and it has hooks on one end, too, and these are hooked to eyes near the door sill on the floor, and then the stewardess throws the rolled up cloth overboard also and it unrolls.

There it is, something like the red plush carpet that the passengers used to get in the plane in the first place. It is sort of hanging there like the tongue of an Irishman on a visit to a Scotch home. Well, that's the chute. You've seen kids go down a slide in a city park? Well, that's the idea of this chute, and now you know where the engineers get their ideas.

Now, we are all set. The rope is hanging out, the cloth chute is hanging out, and after all that struggling the condition of the stewardesses is none of our business, especially as the work has just begun. It is at this point that one of the stewardesses must look the male passengers over while bearing in mind what she is looking them over for, because it is easy enough to forget that that warm sensation comes from the fact that the airliner is on fire. It is her duty, according to the regulations, to select four of the more simian of the passengers and

AERIAL BILLBOARD

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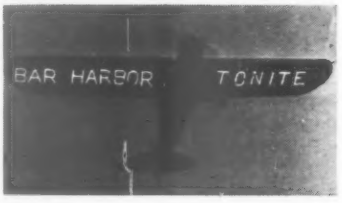
At Nisswa, Minn., John C. Riedl (manager of the Heywood Gulf Lake Airport Corporation) has installed neon signs under the wing of his *Cub*. With the plane, he covers approximately 100 square miles in an aerial advertising business.

Under long-term contracts with local institutions (such as the Bar Harbor night club), he is able to make a tidy profit at rates just above those for dual flying.

Says Riedl: "The hookup is simple. Six one-inch steel straps are bolted to spars on each wing, three to the spar. From these, stubs protrude through the fabric. The frame is made of half-inch welded aircraft tubing and is bolted to the stubs.



"We tape Neon letters to the frame with ordinary friction tape, and run wiring to the cabin along the frame's leading edge. Letters are 21 inches high, and cost of changing from one sign to another involves only the expense of buying new letters. Copy is limited to 18 letters."

It takes 10 minutes to detach the frames and return the *Cub* to NC license.

invite them to slide down the knotted rope to the ground where these men will be useful, for they are an essential part of the apparatus of the chute.

All of this has taken quite a bit of time, as you can imagine, and it will take still more time to unload the people, for there is likely between 50 and 60 of them to dump. Although the regulations do not so provide it would seem like a very practical thing to have the second stewardess, say, pass out magazines so that the passengers will have something to do while they are waiting.

At any rate, the four prehensile gentlemen who have indicated to the stewardess that they have a special aptitude for the job, slide one by one to the ground, a most interesting procedure because if a man is not used to sliding down a rope and does not know just how to do it he is likely to burn the skin off his hands before he can say Civil Aeronautics Administration.

I'll never forget the time that the officials were demonstrating the fire-escape chute to us—which was after the magic ladder demonstration, of course, the latter having been made by engineers. Of course, the officials did not demonstrate the thing to us personally because officials do things by proxy except a very few personal things, and when it comes to ropes, why, they have been telling us what to do with them for quite a while. So the officials threw the rope out of the door of the demonstration plane and told us to skin down it, which is not a figure of speech. But we said that the only rope that we knew about was what our wives gave us and that wasn't much, and would they please go down themselves especially as things had been pretty dull lately.

Well, just then one of the young co-pilots who was full of regulations and vinegar and wishing the officials to look upon him with a favorable eye, for what reason beats me, took a grip on himself and the rope, in that order. He wound his legs around the rope in the professional manner so familiar to us from watching high school dances, and he started down the rope, which was not much of a feat because gravity was helping him. Maybe helping him a little too much because when his hands began to smoke he let loose, but his legs held on, and the result was that he did a flip over or a reversal of form, as it is called, so that his skull fetched the concrete pavement a manful whack.

Naturally, those four gullible gentlemen who have skinned down the rope, to go back to the case I spoke of where you are on the ground with your airliner on fire, those four gentlemen are there for a purpose. The stewardess has previously instructed them what that purpose is to be, and that is to take hold of some rope hand-holds or loops that have been sewed on the sides of the oblong strip of cloth, two men on each side, and to stretch it out so that it gives the impression that it is a fairly reliable slide or chute.

Since one of the men has a sprained ankle, two have burned out palms on their hands, and the fourth has come to his senses and gotten the hell out of there, the stewardess is again confronted with the task of selecting four more men to skin down the rope.

All of this, of course, takes some time and so the second stewardess will pass out magazines to the passengers so that their wait will not seem overlong and they will have a good impression of the efficiency of the airline. Those passengers who do not care to read will, you may be sure, be getting better acquainted with each other and soon the cabin looks like a jolly party, say at an Australian tag match or at Macy's on sale day.

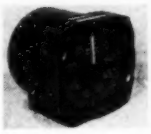
But sooner or later, so the hope goes, four men do get to the ground in shape to take hold of the cloth chute. This is when the real genius of the designers becomes evident because no ordinary mortal, now that W. C. Fields is gone, could have thought of it. The idea, you know, is for a passenger, the first one if he or she is any good at breaking head locks and scissors, and if not the stewardess will aid, to jump into the chute and go sliding merrily to the ground accompanied by jolly laughter.

The chute does not work quite that way, however. Suppose you are a passenger and you jump into the chute and begin to slide. You don't slide far. The cloth is by no means solid and it gives under your weight and what happens next is that your shoes, or the heels of them, catch in the indentations they make in the rather slack fabric and your feet stop with great suddenness and promptitude but the rest of you, having more weight and thus more momentum, continues and you do a belly flop like you used to in the old swimming hole except that here you don't have any water and you go sliding along, plowing up the earth with your nose, or at least as long as your nose lasts; people vary in this respect. This makes you think of the airline advertisement that recommended that you travel by air and see the country. Although now you are not seeing much of the country but only a very little of it you sure are getting a close-up.

Practice evacuations had shown up this trouble, also, so just before each passenger jumps the stewardess will chin with him a while and tell him to hit on what she calls the small of the back, as distinct from what it has been our custom to use in such cases, the big of the back, and to hold his feet up in the air like he used to do when much younger. Now, this sort of thing is all right for a man, but consider for a moment the case of a lady. Not only is the gesture not dignified but no lady wants to be in such a position faced by four men. One maybe, but not four. My goodness!

Of course I am only ribbing the engineers because they are to pilots what mothers-in-law are to husbands but if some of them should get their viscera in an uproar over it, let them take a look at the fire evacuation means that they have spawned and say nothing more until they have done something about it. It ought not to be too tough a problem for men brilliant enough to tree an integral to be able to design an airliner that people can get out of. END

INSTRUMENT SPECIALS



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The Avis Airlines Rent-A-Car System, with headquarters in Detroit, now operates a fleet of 3,000 new cars in 35 principal cities in the U.S.

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Four major airlines which hold contracts with Avis (American, Eastern, United and Capital) will accept reservations for rental cars and teletype them to the passengers' destinations.

—M. W. BOWMAN

Russian Bomb

(*Continued from page 15*)

that could be inflicted by such raids is a factor that cannot be ignored if the country is to be fully prepared. Even if the atomic bomb has come in for some recent debunking, it still packs a terrific wallop. It would take only one to devastate a wide area.

The first step in putting the U.S. defenses in order involved a little testing work. In recent years, various war games have been held to seek out weak places and determine where invaders might break through. For obvious reasons, military officials do not desire to publish all their findings. It is significant, however, that several mock attacks reached their goals. In one such operation, Dallas and Houston, Tex., as well as Little Rock, Ark., were technically destroyed by a simulated enemy air fleet flying in from an off-shore base.

Next was the launching of a program to build an effective radar screen around the borders of the country. Congress did not get around to this job until early this year. It authorized an $85,000,000 program which will not be completed until 1952. Although they can't talk much about it, defense officials are known to be cooperating with Canada in the matter.

Air Force officials in charge of the construction and operation of the radar network frankly concede that there is no such thing as absolute protection. When questioned by Congress on the subject they pointed out that it was all relative. They also indicated that their job would be more difficult if they had to defend the country against some of our own high speed, high altitude equipment.

Also assigned to the Air Force is the responsibility for setting up and operating an adequate nation-wide air-raid warning system with the help of civilian volunteers. In what was termed "Operation Lookout," this system was given a small scale try-out in the northeastern states last summer. Without going out of its way to advertise the fact, the Air Force will make similar installations throughout the country.

As the new plan works, the Air Force finances and installs the air raid warning net down to the four-county level—the smallest geographical unit which the Air Force will organize. The warning system at lower levels will be handled by local civil defense establishments. The approach is somewhat different from the one used during the war when the civilian defense organization ran the whole show and the Air Force was at the tail end of the system. However, civilian volunteers will be used as spotters this time as they were used before.

At the center of the civilian defense organization is the National Security Resources Board—an inter-Cabinet agency with its own staff. The general function of NSRB is to help ease the impact of national emergencies on the civilian economy. It has made several broad studies relative to the mobilization of the nation's resources. Unfortunately, its functions are not too well understood and some of the few speeches of its officials have been misinterpreted. It has never done many of the things attributed to it.

For example, NSRB has not laid down plans for rebuilding the cities in separated rings; it has not proposed a policy of "every man for himself" in the event of an atomic attack; it has not called for the construction of bomb-proof cellars in Federal buildings. However, it will soon have available a manual on construction standards related to defense from atomic bombs.

It is planned to have NSRB tie in with all major industries so that each will know how it will fit into mobilization plans for a national emergency. In the case of aviation, the M-day plans have pretty well jelled. There is no question about what aircraft manufacturers and their suppliers would do. They would be up to their ears in turning out military planes.

As far as the airlines are concerned, it is no secret that the Government would requisition some of their equipment. This time, however, it would probably confine its seizure to the four-engined jobs—planes that could do long-range transport duty. There still is some uncertainty as to whether the Government would take over the planes outright or make arrangements for the owners to operate them on a contract basis subject to official orders.

Surveys have been made and others are in progress to determine how civil airports will fit into the picture. In general, the purpose of these studies is to find out which ones will be needed by the Government and which of those required will need expansion. Information also will be gathered as to where entirely new fields might be necessary.

The fixed base operators, too, will have several jobs cut out for them. Not only will they be expected to help round up trained men for important war work but they will probably be used for repairing and overhauling transport aircraft. At least this will be true for the larger operators.

Had it not been for the Russian atomic explosion, the NSRB would still be in a sort of twilight zone of existence, with its plans half made but uncertain about how much it could say without scaring people. Now NSRB is able to do some of the things that need to be done. It has already sent letters to the state governors asking them to start civil defense planning. It promised that the Federal agencies would supply the states with information as to the various kinds of attack to be expected if war comes and how to meet them.

For its part, the Atomic Energy Commission is also known to be working on a pamphlet or manual dealing with protective construction in the atomic age and discussing cleaning up operations if an atomic bomb should fall. Actually, this material was ready for release some time ago but was held back for a time. Presumably it was felt that the Russians might be given information that they did not have. Recent events have put an entirely different complexion on this situation. Anything that the Commission has

to divulge on the subject will now help the folks at home as much or more than it does the Russians.

On the legislative front, an interesting bill calling for a coordinated program of disaster relief has made its appearance. Sponsored by 42 senators, it deals ostensibly with peace-time disasters such as storms, floods, or fires. However, it is broad enough to cover damage inflicted by enemy action. In fact this is probably its real purpose. What it does is to provide for the distribution of emergency supplies owned by Federal agencies and to authorize Federal grants to assist stricken communities in repairing or replacing essential facilities. It is expected to pass next session without more than a ripple of opposition.

Try as they will, however, Government agencies have not been able to prevent some twisting and distortion of their motives and plans. The general view in Government circles is that people should neither bury their heads in the sands to the seriousness of the world situation nor work themselves into a frenzy about it. A rational course somewhere half-way between these two extremes is what they would like to see—and fortunately that is the way the country seems to be reacting.

What about the impact of the Russian bomb on U.S. military strategy? Secretary of Defense Johnson has announced that it makes no difference to him; that he will not recommend any additional allocations for the Air Force or the Navy. In fact he seems bent on whacking down the Navy's budget still more. But Congress has something to say about such things too.

It is a fairly good bet that Congress will step up the Air Force program to help it reach its 70-group goal sooner than 1952. There also are predictions that the funds for fighter planes will be increased even more.

Contrary to the fears expressed by the Navy, Johnson and the Joint Chiefs of Staff have not built up a lopsided strategy depending on long range bombers alone. Carriers and carrier planes have not been eliminated from the scheme of things.

Arms aid to friendly European countries can be counted on to continue. The $1,300,000,000 provided by Congress last session is just a starter. Obviously it won't take this program long to have a stimulating effect on the aircraft industry. One way or another the equipment taken by Europe will lead to additional purchasing. Present plans are to have the Air Force turn planes and supplies over to the countries we want to assist and then replenish its stocks by placing new orders with American manufacturers.

There is one bright theory about the Russian bomb to the effect that its development might create a military stalemate. The argument is that since each of the two major powers now has this terrible weapon, each would hesitate to use it against the other for fear of retaliation. This may be merely wishful thinking. On the other hand, it is commonly believed to be the reason that neither major opponent in World War II used poisonous gases against the other. END

STATEMENT OF THE OWNERSHIP, MANAGEMENT, AND CIRCULATION REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946. (TITLE 39, UNITED STATES CODE, SECTION 233.)

Of Flying, Published Monthly at Chicago, Ill. for Oct. 1, 1949

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5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: .....
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A. T. PULLEN,
Business Manager.

Sworn to and subscribed before me this 22nd day of September, 1949.

[SEAL] ALBERT H. WITTHOFT,
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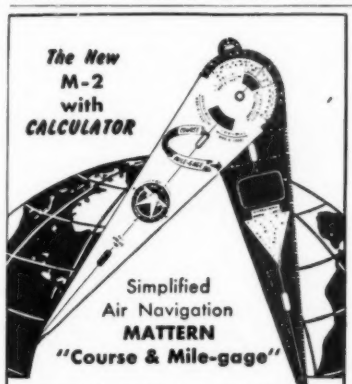
(My commission expires April 9, 1950.)



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Leatherneck

(*Continued from page 23*)

has "lateral" control in the DCNO job, and "straight down" control in the Assistant Commandant slot.

Direct command of the Marine aviation units is exercised through two Fleet Marine Forces—one to each ocean. Under the chief of each Fleet Marine Force is a CGFMF for Air. In the Atlantic, it's Maj. Gen. L. E. Woods; in the Pacific, Maj. Gen. Field Harris.

Most Marine air strength is concentrated in the U.S. east coast and in the Atlantic FMF. Actual distribution is, of course, classified. But total strength of Marine aviation is set at 23 combat squadrons.

Of these, 16 are fighter outfits with 24 planes each. They fly a new version of the Chance-Vought *Corsair* (F4U) or one of the Navy's newest jets, the McDonnell *Banshee* (F2H).

Supplementing the fighter strength, five all-weather squadrons are particularly trained for protecting ground troops from night air intruders and for night air strikes. Three squadrons are equipped with the Marines' twin-engined night fighter, the Grumman *Tigercat* (F7F) and two are equipped with the night-adapted *Corsair*.

To supply intelligence information to the ground forces, the Marines have two VMP's (photographic squadrons) for aerial reconnaissance. They use standard fighters modified to carry the necessary camera equipment.

In addition to the 23 combat squadrons, the Marines have four multi-engined squadrons for combat transport operations. These units are equally divided between the Atlantic and Pacific FMF's, and use both four-engined Douglass R5D's (*Skymasters*) and twin-engined Curtiss R5C's (*Commandos*). Ten Fairchild *Packets* are on order, and are scheduled to replace the R5C's.

Two instrument training squadrons round out the list, and they are the only two Marine squadrons which don't have direct support to ground troops as their primary mission.

Unfortunately, both for the men who'd like to be Marine pilots and for the organization itself, the small Marine air arm didn't have funds to add a single new pilot to its 1,953-officer strength during fiscal 1949. Counting heavily on normal attrition to reduce the complement in 1950, the Marines hope to add 50 new pilots from the Navy Aviation Cadet program. In 1951, if they're lucky, they'll get 65 more new graduates.

These fledgling Marine pilots spend their first two years in a combat squadron, where they're indoctrinated in Marine tactics. The next two years, if conditions permit, the pilot is assigned to a transport or instrument training squadron to sharpen his instrument technique before he is returned to an operational group.

In peacetime, combat squadrons are constantly in training. The present training program is three-phase, extending over 18 months. At the conclusion of the third phase, squadrons begin again on the first. The cycles are broken down as follows:

● *First Phase.* For four months the pilot gets no combat training. He checks out in instruments, qualifies with the rifle, takes accrued leave, and spends three weeks operating with ground divisions to learn first-hand the problems of the rifle-toting Marine.

● *Second Phase.* For five months, the squadron digs into operating tactics. Formation, gunnery, bombing and photography (if it's a VMP) are practiced daily. In addition, the squadron checks out in carrier landings, although at present no Marine squadron is assigned to a carrier. Four squadrons are embarked on the carriers on a rotational basis. And at all times one-third of the Marine groups can go aboard on short notice. Because Marine ground operations are almost invariably amphibious, the carrier looms large in Marine air training. Leatherneck flyers look on the carrier as a mobile base from which they must fly support missions when no land bases are available.

● *Third phase.* The final nine months of the training cycle serves as a squadron testing period. Through trial and error (and, the Marines say, not too much of the latter) the Leathernecks smooth out their squadron tactics, operating frequently in connection with ground maneuvers. They fire both live and dummy ammunition. Though information on actual loads of combat planes is classified, it is known that the fighters carry only armament which can be used in direct support attack—ammunition for wing guns, napalm, five-inch rockets, and relatively small bombs (not over 1,000-pounders.)

Even in location of its main air bases, Marine aviation is angled toward support of ground troops. El Toro, Calif., on the West Coast is only 15 minutes by air from the large Marine staging area at Camp Pendleton. Cherry Point, N. C., is just 10 minutes by air from the famed Marine Corps base at Camp Lejeune, N. C.

About a score of flying officers (known as Forward Air Controllers) operate with each Marine division. They advise ground commanders on direct support missions and originate mission requests. This gives additional close liaison between the boys lugging rifles and the pilots overhead.

Air support theories, though well developed in World War II, are evolutionary. The four-plane division and two-plane sector developed in World War II are still in use but, as one Marine aviator said, "When a better idea comes along, we'll encourage it. Maybe, with the introduction of fast jets, the division will be passe. We're trying to keep our eyes on the future as well as our fingers on the past."

Looking ahead, the Marines are experimenting with a new support idea at the Quantico (Va.) Marine Base. Flying from Turner Field, a number of rotary-wing aircraft attached to experimental Helicopter Squadron One are being tested for practicability as combat transport aircraft. The test planes vary in size from the large Piasecki *Flying Banana* down to a Bell two-place job.

If present successes in experimentation continue, helicopters may make obsolete the famous amphibious personnel boats of the past war. Marine findings indicate it may be feasible to transfer from ship to beachhead troops, supplies and supporting artillery; to evacuate wounded; to lay communications lines—all via helicopter. Major problem is helicopter vulnerability. They're sitting ducks when discharging passengers and equipment, but with fighter and attack plane support the operations may become practicable.

Even Marine Reserve squadrons are keyed to the high pitch of tactical support. With at least one fighter squadron at 25 of the Naval Air Reserve stations or training units, the Marines count on their reserve outfits and provide instruction and practice for the pilots. [In a forthcoming issue, FLYING will present a comprehensive report on the Naval and Marine air reserves.]

Last spring, after Defense Secretary Louis Johnson cancelled the Navy's supercarrier project, rumors flew that Marine aviation would be "cancelled out." Lights burned late in Marine Headquarters and the Navy Department, and resulting from these midnight sessions were demonstrations for Congress and the press on the capabilities of Marine aviation.

An upsurge of public interest in the Marine air arm brought quick denials from Johnson that any plan to scrap the Marine air arm had been considered.

Though an outright "scuttling" seems a distant possibility, Marine flyers still are worried over the prospect of slow starvation. If Marine aviation funds are progressively decreased, as the present trend seems to indicate, Marine aviation could be reduced to impotency. And, some of the pilots contend, an inadequate support force would be worse than none at all. An *illusion* of security could lead the Corps to disaster if there were another war.

This worry about the future has served only to heighten *esprit de corps* but it hasn't brought about 100 per cent harmony.

There are divergent schools of thought even within Marine aviation. Some factions are pushing for the introduction of helicopters. Others insist the rotary-winged craft are too vulnerable. Some high officers say the corps should order only a general-purpose aircraft (like the *Corsair*), which is equally good as a fighter or support plane. Others say it is important that the Marines requisition both fighter planes and direct support planes.

But there's unanimity on the main point. Both sides agree that Marine aviation needs the best "corset"—the instrument that will give the most support. Over 82 per cent of the Marine pilots are qualified as infantry leaders. They know what the doughboys need in battle. And they believe they are the only flying force that can give the Marines the support they need. END

Raising Cash

(*Continued from page* 38)

neighbors to see if they have old papers and magazines. Then, on a designated day, they collect it for sale by the club. One club saved itself the collecting by giving short hops to youngsters who brought 100 pounds to the field or the collection point. Tons of paper were "collected" this way in exchange for around-the-field-and-down-again flights, and the paper sales added a neat sum to the club treasury. This was in the days when scrap paper brought money. Better check to make sure you have a market before you try it.

Up in Manitoba a year ago I noticed something that might bring in some ready cash for the club treasury. At the seaplane base at Flin Flon (near Beaver Lake) a *Norseman* landed with several hundred pounds of fish for the cannery. As it touched the water and bounced a few times before settling in for keeps, a brother pilot of the same company gleefully chanted: "Fifty cents—a buck—a buck-fifty—and—TWO dollars!" It turned out that the pilots had to ante up 50 cents for every bounce in a bad landing.

Fifty cents a bounce is high for the average club pilot to have to ante up. You might make it a nickel for the student ticket holders, a dime for those who have soloed and a quarter for the private tickets. This should add to the treasury as well as the skill of the pilots.

Club quiz programs can be fun and profitable. The questions can be on aviation, the CAA regulations, or anything BUT aviation. Each one puts in a dime to start the ball rolling, then pays another dime for every question missed. Mix in some silly ones for laughs. For each question a member answers correctly he gets one point but no money. At the end of the quiz the one with the most points gets all his "miss-money" back (and perhaps a dollar bonus) while the one with the *most* misses has to donate an amount equal to what he has already forfeited. No one gets badly bitten, one member makes a dollar bonus or at least gets all his money back, and the club has a lot of fun and some cash for the kitty. This quiz may be run with photographs of aircraft (as a "plane spotters quiz") instead of question. Borrow a "magic lantern" for the photo quiz.

One club conducted a drive for better care of engines and more efficiency in starting them. A properly adjusted and tuned powerplant, properly "twisted," usually starts promptly. If not, the starting technique is faulty or the engine is not up to snuff. This club decided to make the tough-to-start engines a source of revenue to help the club kitty as well as keep the members and mechanics on their toes. A sign was posted warning the members that a penalty of a dime for every twist a pilot or mechanic had to give an engine to start it after the original twist would be levied from that date until further notice. Not only was the "twister" fined but the chap in the cabin—just to prevent some character from leaving the switch off or the choke setting wrong while the man at the prop ran up a bill a dime at a time. The club treasury did a good business for a few days until the starting technique improved to a point where the fines no longer paid off. Engines were in A-1 condition and the boys and gals nearly pulled their arms off to save a dime.

One flying club needed a meeting room or some kind of a clubhouse. They not only got that, but a cash bonus as well. They raised money to buy a war surplus B-24 to use the fuselage as a club house by taking off the wings and parking it on one side of the field. When the huge plane arrived they found that the gas tanks were almost full of perfectly good high-octane gasoline. Before converting it into a club room they drained off and sold the fuel for more than they had paid for the bomber, with a neat bonus to help pay for the conversion. Parts of the plane and the instruments were sold as training equipment and souvenirs to the tune of $100 more.

You can't expect that kind of luck every time you start a money-raising project. But by using originality—and energy—you should be able to bring your club's hourly rates within reach of every member. END

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Report from Washington

(*Continued from page* 40)

over the top of the world. The main thing to consider, it believes, is not whether a strategic plant is near the coast but whether likely targets are bunched in the area.

In general, the NSRB slant is that the large cities with their concentrations of industry, are the places where the risk is the greatest. With a given amount of bombs, enemy raiders could achieve the maximum destruction in such centers. As the agency points out, "atomic bombs are expensive." It doubts that the enemy would waste them on smaller places—say cities of 50,000 and under.

This does not mean, however, that NSRB advocates the scattering of airplane plants and other important facilities all over the map. To the extent that dispersion is necessary, officials of the agency believe it can be accomplished just as effectively and with far less disruption merely by moving plants out to peripheral areas of the cities in which they are now located.

Outlying communities are relatively safe if they are at least five miles away from a target area. At the same time they are more accessible to parent offices than locations half-way across the country. Employees can reach such locations without moving their homes. This is particularly important because experience during the war showed that when new facilities were installed in a locality additional housing usually was necessary to accommodate the influx of workers.

No Government agency now has the authority or the funds to provide housing for the employees of plants that are shifted around. Moreover, the existing store of housing in almost every city is being used up to the rafters. It appears to be just plain common sense to avoid large shifts of workers around the country.

When all factors are weighed it is hard to avoid the conclusion that the aircraft industry is not in too bad a position as far as the location of its plants is concerned. A look at the map discloses that there are four plants in the Los Angeles area—Northrop, Douglas, Lockheed, and North American. Then there are the Consolidated and Ryan plants in San Diego. This is some concentration but southern California is not regarded as being too attractive to enemy bombers. It would not rank with the heavy industrial centers around the Great Lakes and in the Northeast.

The Boeing plant in Seattle, about which the Air Force has some qualms, would appear much less tempting to aggressors than important aluminum and atomic energy installations in other places in the Pacific Northwest. When it comes to the East Coast, there is less concentration. The Republic company has a plant at Farmingdale, Long Island, and Grumman is located at Bethpage, also on Long Island. Not too far away is the Pratt & Whitney engine plant at Hartford. Finally there is the Bell plant at Buffalo, Martin on the outskirts of Baltimore, and Fairchild at Hagerstown, Md.

What about putting plants underground? No one in Washington gives this proposal serious consideration. Such a move on any large scale would be impractical. The Government has no money to finance this kind of construction and industry certainly can't do the job itself. Moreover, underground plants would be much more costly to operate. The general philosophy seems to be that it would be better for each plant to take a calculated risk than to give any thought to a plan that would turn us into a nation of earthworms. END

The Mail Box

(*Continued from page* 6)

written to me. [Ed: Reader Raser offered his collection of over 1,000 airplane photos to anyone interested in having it.] To date I have received 70 answers, and the letters are still coming in at the rate of half-a-dozen a day!

With such a large response, I did not feel I could adequately distribute the collection, and so it was given in its entirety to the first person who replied—an ex-USAF mechanic, who now lives in Oil City, Pa.

EDWARD J. RASER

Trenton, N. J.

ANOTHER COLLECTION

I have a collection of 1,000 sketches of aircraft design and inventions most of which, I am sure, are patentable.

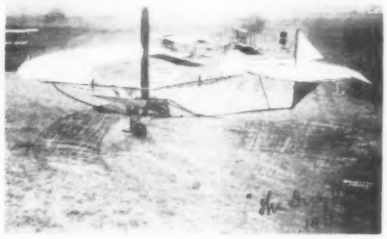
I want to dispose of this collection and wonder if any of your readers would be interested in it . . . free, of course.

RENE CHARETTE

213 Besserer Street
Ottawa, Ontario, Canada

ANOTHER PARAPLANE

In FLYING's September issue an article on the Lanier *Paraplane* reminded me of a photograph I unearthed 25 years ago. The enclosed photo of the 1911 Dietz



Paraplane was found among some trash removed from a house on West 94th St., New York City. The Smithsonian Institution [has] no record of such a plane.

A. C. SORRELL

Riverdale Hills, Md.

SHERIDAN ON THUNDERSTORMS

. . . There are some errors of thinking, some errors of fact [in "How to Fly in Thunderstorms," October FLYING].

The article says ". . . pilots can fly be-

tween saddlebacks . . ." Probably that is true, or was true, in the restricted space in which the Thunderstorm Project planes operated. [But] during the last three years on and near the route between Chicago and San Antonio it has not been true more than half the time. The trouble is high stratus through which thunderstorms poke; the bottom of the stratus often is around 17,000 feet and the top over 23,000 feet. Sometimes the cloud deck at those levels is broken, consisting of many subtypes, but in both cases the pilot cannot see thunderstorms until he hits them.

In passing, it was interesting to note the Project's remarks on lightning, and how pitifully small the experience upon which they are basing their broad conclusions. All their planes during the whole project were hit by lightning a total of only 21 times. If this could be used as a comparison between the severity of their conditions (and the extent of them) and of ours on American Airlines, we would be led to conclude that the Project's planes didn't fly much bad weather. Why, I was hit 12 times on just one flight.

The Project people also say: "No complete radio failure could be attributed to the effect of lightning . . ." They might have gone on to modify that statement by saying, "but there are plenty of official records where that is true." I not only had my radio knocked out recently, but the internal parts of the sets were mostly fused, and many of them vaporized . . .

The Project people also say: "No data was obtained on hidden tornadoes . . . No tornado funnels were observed during the flights, although in one instance a funnel was observed shortly after a mission." . . . The implication seems to be that tornado funnels are not much of a menace. It is perhaps significant that the Project people saw only one funnel outside—I've seen dozens, five in one day.

This, I believe, shows how meager their data is . . .

HIRAM WILSON SHERIDAN
Captain, American Airlines
Glen Ellyn, Ill.

KNOW ANY ACES?

I am compiling a record of all air aces of every nationality who fought in the recent war. That is, pilots who shot down one or more planes. I find it difficult to get the names of USAF, USMC and USN aces. I would be grateful for any information or data your readers can give me . . .

PATRICK J. CASSIDY, JR.
Lis Dhu
Moneyneena
Draperstown
County Derry
Ireland

HOMEMADE MIDGET

You should have devoted two pages to Lester Garbrick's midget biplane ["The Mail Box," October FLYING].

To you Yankees, an amateur's ability and progress may be commonplace, but we Crackers consider such goings-on an accomplishment worth mentioning in a bigger way. How about more of this *real* private flying and less on "How to Snap-Roll the B-36."

W. M. SHULTZ
Tampa, Fla.

Garbrick's midget plane is sure a cute piece of work. One question, however: To my knowledge the Indian Scout engine weighs a great deal more than 34

(*Continued on page* 82)

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D-18'S TWINS: 8 available. 1946, 7 place executive. No. 81179F, has lavatory, 3 low time engines, hydromatics, nose tank, airline instruments and radio, ADF, de-icers, anti-icers. Outstanding. $38,500. Apply Powers & George, Aircraft Brokers, 475 5th Ave., New York, N. Y.; or 505 N. Ervay St., Dallas, Tex.

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BONANZAS. Bargains both models. Low times. High values. Box 1709, Wilmington, Del.

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NAVIONS: 31 available. 1947, No. 8891HF has 96 hours. Painted. ADF. Soundproofed. Platinum plugs. Excellent. $5450. 1948, No. 4342KF has 185 hours. Gyros. 2 radios Loop. Marker beacon. Exceptional. $8200. 1949, No. 4897KF, has 50 hours. Extra tank. Gyros. Loop. New. $9000. Apply, Powers & George, Aircraft Brokers, 475 5th Ave., New York, N.Y.; or 505 N. Ervay St., Dallas, Tex.

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(*Continued from page 79*)

pounds and eight years ago would have been even heavier . . . Is it possible that the engine could have been altered in any way to knock off that much weight?

Let's have more pictures of home-built designs in future issues . . .

GORDON SPRINGBORG
Lansing, Mich.

● Builder Garbrick advises: "The motor used in the small biplane was taken from a 1918 Indian Scout motorcycle. With the flywheel removed and replaced by the propeller and flange the motor weighs 34 pounds. The prop is 38 inches long and has a 24-inch pitch."—Ed.

CHEAPER FLYING

Since the article, "My Plan for Cheaper Flying," appeared in FLYING's August issue, I have received over 500 inquiries asking for additional information. These queries have come from every section of the country.

Several clubs already have started operation of the plan, and many interesting points and ideas have arisen. One, brought to light at the grand opening of the Grand Valley Flying Club at Grand Rapids, Mich., is: a number of clubs could make arrangements with other clubs patterned after my plan to honor visiting members at club rates, upon proper identifications. This idea has been adopted by several clubs in this territory.

JAMES D. GOGGIN, President
Associated Flying Clubs of America
Palwaukee Airport
Wheeling, Illinois

WANT TO EXCHANGE NEWS

As news of U.S. aviation is sparse here in New Zealand, I would appreciate corresponding with an engineer, a pilot, or model builder about my own age (21).

W. T. C. MEXTED
Clevenled Settlement
Palmerston North, New Zealand

I am a licensed pilot with a mere 54 hours to my credit. However, I'm learning fast and would like to correspond with some private pilots in the U.S.

JOHN L. DAWSON
110 Elizabeth St.
Launceston
Tasmania, Australia

I would like to exchange aviation news with some of your U.S. readers. . . .

H. R. PRINCE (age 14)
6 Clarendon Road
Ashford
Middlesex, England

TIP ON A TIP

Concerning the flying tip on page 76 of FLYING's October issue, it might not be amiss to mention a means of being sure the shadow you see on the ground is that of the airplane you're flying, and not of some other craft. When other planes are near you, it sometimes is difficult to tell which shadow is your own. Your shadow, however, will always be the one with slightly blurred outline; all other shadows will have sharp edges . . .

LLOYD M. SOUTHWICK, M.D.
Edinburg, Tex.

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***For peak performance of aircraft with higher cruising altitudes, Aeromatic Propellers can be equipped with special Aeromatic Altitude Control.**

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New Cumberland, Pa.

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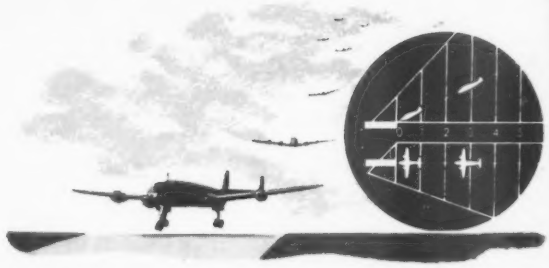
also available for numerous foreign models

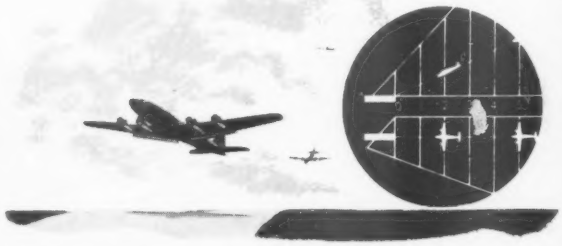
GCA speeds up IFR Traffic 300%

Los Angeles Municipal Airport is closed or "on instrument" 20% of the time. During this bad weather period, the airport operates at only 60% efficiency. When a $20,000,000 airport functions at only 60% efficiency, the airlines, air passengers and the taxpayers stand the loss. One airline conservatively estimated it lost $200,000 at one airport during a 90-day period because of bad weather. And this does not consider the incalculable loss of passenger goodwill resulting from schedule irregularity.

To master bad weather and its costs, GCA is being installed at L. A. Municipal Airport and 82 other airports across the nation. GCA is both a fail-safe, precision radar landing system and a great factor in air traffic safety, operation and efficiency. GCAirports can operate near 100% efficiency in all weather. With GCA, airlines can be on schedule with safety...and with profit.



GCA Unstacks Aircraft a Minute Apart—4 Times Present IFR Limits. At most airports, CAA IFR procedure permits aircraft to unstack at 4 minutes minimum spacing. With GCA's precision scopes showing each aircraft's position in 3 dimensions, the new CAA Radar Procedure Manual permits unstacking at 1 minute spacing . . . 4 times as fast with GCA. Actually, with GCA, stacks seldom develop, because GCAirports handle IFR traffic with clear weather speed and safety.



GCA Speeds Up IFR Landings and Take-Offs 300%. In IFR weather, once an aircraft reports over the Downey marker on final approach at Los Angeles, all take-off aircraft are held. At time of report, the landing aircraft is 5 minutes – 15 miles – from touchdown. And should the landing aircraft miss first approach, present practice at Los Angeles keeps the take-off aircraft grounded until a successful approach and landing is made. With GCA, planes can take-off until landing aircraft is within 1 minute – 3 miles – from touchdown.

GCA Isolates Rogue Aircraft. When an unidentified aircraft flies into a crowded airport area, GCA spots its position immediately. Unidentified "rogue" aircraft accidentally flying off course into the Los Angeles Airport area could conceivably disperse a dozen large transports at incalculable cost and jeopardy. GCA's high powered search scopes bring the rogue under control at once, and any danger of collision is eliminated.

GCA Eliminates Costly Turn-Backs and Safety Climbs. In IFR weather, the bogey of all pilots is the tedious, time-wasting climb to avoid stacks and other aircraft. Departing aircraft must fly "over the top"—sometimes 14,000 feet—before proceeding on course. With GCA, departing aircraft must keep only a 3-mile horizontal distance from other aircraft. They can because tower GCA gives them the relative bearing and distance of other aircraft. Also, departing aircraft under GCA surveillance take off 1 minute apart – 3 times present CAA limits.

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